

2007 SO. CA. FIRES
POOMACHA HARRIS WITCH
BURNED AREA
EMERGENCY
STABLIZATION PLAN

BUREAU OF INDIAN AFFAIRS
BUREAU OF LAND MANAGEMENT
US FISH AND WILDLIFE
SERVICE
LOCAL INDIAN AFFAIRS

RANCHO BERNARDO CALIFORNIA
NOVEMBER 2007

DOI INTERAGENCY BAER TEAMBURNED AREA EMERGENCY STABILIZATION PLAN

2007 SOCAL FIRES

POOMACHA
HARRIS
WITCH

Harris Fire Burned Area Emergency Stabilization Plan

I. EMERGENCY STABLIZATION PLAN CONCURRENCE

Concur

Concur with Revision

Disapproved

Explanation for Revision or Disapproval:

Andrew Yuen, Project Leader, San Diego NWR Complex, USFWS

Date

I. EMERGENCY STABLIZATION PLAN CONCURRENCE

Concur

Concur with Revision

Disapproved

Explanation for Revision or Disapproval:

Steve Thompson, Regional Director, Region 8, USFWS

Date

II. EMERGENCY STABILIZATION PLAN APPROVAL

Approve

Approve with Revision

Disapproved

Explanation for Revision or Disapproval:

Brian McManus, Director, Branch of Fire Management, USFWS NIFC

Date

BURNED AREA EMERGENCY STABILIZATION PLAN

2007 SOUTHERN CALIFORNIA FIRES

EXECUTIVE SUMMARY

This plan addresses emergency stabilization of fire effects resulting from the Harris, Witch and Poomacha Fires that burned on Department of the Interior (DOI) lands in San Diego County, Southern California. DOI lands addressed in this plan are administered by the Southern California Agency, Pacific Regional Office Bureau of Indian Affairs (BIA), the California Desert District, Bureau of Land Management (BLM), and the San Diego National Wildlife Refuge, US Fish and Wildlife Service (FWS). This plan has been prepared in accordance with the *U.S. Department of the Interior, Departmental Manual, Part 620, Chapter 3 (Wildland Fire Management)* and the *Interagency Burned Area Emergency Response Guidebook (February, 2006)*:

The primary objectives of the 2007 Southern California Burned Area Emergency Stabilization Plan are:

Human Life and Safety:

- To prescribe post-fire mitigation measures necessary to protect human life and property

Soil/Water Stabilization

- To promptly stabilize and prevent further degradation of affected watersheds and soils

Threatened & Endangered Species Habitat Stabilization

- To prevent permanent impairment of Federal Threatened and Endangered species habitat

Critical Heritage Resources

- To stabilize and prevent damage to known cultural resources

Noxious Weeds

- To deter the establishment and spread of noxious and invasive species

Monitoring

- To monitor treatment effectiveness to determine if additional or amended treatments are required

A wide array of treatment options and/or actions allowable by Department of the Interior (DOI) policy has been considered to attain the above objectives.

Introduction

The National Interagency Burned Area Emergency Response (BAER) Team conducted an analysis of fire effects using aerial and ground reconnaissance methods throughout the fire areas. The watershed group assessed and mapped the overall fire impacts on watershed conditions and developed a soil burn severity map. The vegetation specialists worked with local vegetation, range, and forestry specialists to evaluate and assess fire effects and wildland fire suppression impacts to vegetation resources, including mapping noxious invasive weed populations and fire induced vegetation mortality. The archeologists inventoried fire effects to known culturally significant sites to determine if these sites require emergency stabilization or protective treatments to prevent further damage or loss. The wildlife biologist assessed fire effects to Federally Threatened and Endangered (T&E) species. The Geographic Information System (GIS) specialists gathered data layers necessary for the plan, coordinated GIS activities, processed data calculations for other resource specialists, and produced maps for analysis, for the BAER Plan, and for presentations.

Resource assessments produced by these specialists can be found in Appendix I and individual treatment activities proposed for funding and implementation that have been identified in the resource assessments are located in Part F, Treatment Specifications. A summary of treatment costs can be found in Part E, Cost Summary Table. An Approval Page is provided as a signature page for agency review and approval at the front of the plan.

Appendix II contains the environmental compliance documentation prepared in accordance with the requirements of the National Environmental Policy Act (NEPA), and BIA and USFS policy. This appendix analyzes reasonably foreseeable individual and cumulative impacts of treatment actions proposed in the BAER Plan and evaluates the consistency of proposed actions with existing programmatic NEPA documents. All proposed actions are either categorically excluded from NEPA or are covered in existing land management plans with approved environmental assessments. Appendix III contains photographic documentation of fire effects and Appendix IV contains BAER Plan Maps produced to assist with resource damage assessments. Appendix V contains supporting documentation for the plan.

2007 Southern California Fires Information

The Harris, Witch and Poomacha Fires were among the largest of the 20+ wildland fires that were ignited over several days of Santa Ana wind conditions in the final weeks of October 2007.

The Harris Fire began October 21st and was not contained until ten days later on October 31st. The fire burned a total of 90,345 acres in southern San Diego County of which 18,217 acres are managed by BLM and 4,137 acres are under US Fish and Wildlife Service administration. The cause of the fire is still under investigation.

The Witch Fire burned from October 21st until October 31st burning 163,111 acres. This included 10,302 acres of BIA administered lands and 1,066 acres of BLM lands. The Witch Fire was determined to be human caused.

The Poomacha Fire began October 23rd and was not contained until November 8th. The fire consumed 49,563 acres of which 21,297 acres are administered by the BIA and 2,683 acres are on BLM administered lands. The ignition source of the Poomacha fire is still under investigation.

Resource Assessments

Watershed and Soils - The Harris Fire was dominated by Low and Very Low Soil Burn Severity with scattered areas of Moderate Soil Burn Severity. The Low and Very Low areas of the burn area typically consumed small diameter fuels of less than ¼ inch in light to moderate brush, 50% to 100% of the leaf litter understory, and 80% to 100% of the above ground organic matter from grasslands. The Moderate areas of the burn area typically consumed larger wood materials in riparian areas and up to ¾ inch diameter materials in dense brush areas with scattered root crowns burned. The fire consumed from 80% to 100% of the understory leaf litter and sparse forbs.

The Witch Fire was dominated by Low and Very Low soil burn severity with pockets of Moderate soil burn severity. The primary watershed response within the fire is expected to include an initial flush of ash and organic debris with small amounts of localized erosion in response to typical precipitation events. Field investigations indicated moderate water repellency in unburned areas, as well as areas within the fire, pointing to a natural tendency to repel water. As a result, post-fire runoff and erosion are not expected to increase significantly over pre-fire levels. Temporary increases in spring flow and stream base flow may occur where dense shrub canopies were consumed by the fire. Eight values at risk sites were identified for protection treatments, including residences located near the toe of steep slopes and in proximity to drainages from the burned watershed. Other treatments are for channel clearing and culvert cleaning.

The Poomacha Fire created significant watershed conditions for the protection of values at risk. This fire was dominated by Low and Moderate soil burn severity with pockets of High. The High soil burn severity

creates high soil heating, where all the duff and litter is consumed leaving fine ash, often one to two inches deep and creating high watershed response for flooding and debris flows. This High soil burn severity was found in canyon bottoms and mountain ridge tops where fuel loads were high. The watershed response within the fire is very high due to the steep slopes of the topography, which prompted the need to recommend structural protection treatments for residence and infrastructure located near the toe of steep mountain slopes and in proximity to drainages from the burned watershed. Flood warning systems are also prescribed for communities within the flood zones associated within and outside of the burned area.

Vegetation - The purpose of the vegetation assessment was to determine if lands burned directly by the wildfires are likely to recover naturally from severe fire damage or if emergency stabilization treatments are required to ensure that vegetative recovery will emulate historic or pre-fire ecosystem structure, function, diversity and dynamics. This vegetation assessment includes the development of treatments to prevent the establishment and spread of noxious and invasive weed species within the burned area and to protect recovering vegetation resources from off-road human use, and protection of public health and safety. Critical habitat for the California gnatcatcher, Quino checkerspot butterfly, and listed species such as the Otay tarplant and Mexican flannel bush makes vegetative recovery a significant issue. This assessment also includes management recommendations combined with treatments for the protection of recovering burned areas to benefiting vegetation recovery and soil stability.

Vegetation above ground kill was used to classify impacts to vegetation resources on the fires, since most all species are expected to resprout or reseed. Kill was determined to be 48% high, 31% moderate, 13% low, and 8% low to unburned. Numerous ecological vegetation types classified within the fire by LANDFIRE were grouped into a final 12 types. Predominant among these groups are Southern California Coastal Scrub, Southern California Dry Mesic Chaparral, and Southern California Oak Woodland and Savanna. Mixed conifer occurred in the higher elevations within the Poomacha Fire.

Noxious and invasive non-native plant species are present within the fire area. Additional populations were mapped as part of the vegetation field assessment. These species are expected to expand their range unless detection and control treatments are proposed. Early detection (monitoring) and control treatments are proposed. The major strategy of the vegetation treatments is to allow native shrubs and grasses to recover to a point except in areas where designated Critical Habitat for listed T&E species occurs.

Invasive weed treatments adjacent to or beyond current infestations and at new infestations are proposed. Treatments are needed to prevent expansion on invasive species aggravated by the fire or fire suppression activities. A treatment specification to monitor for additional infestations or spread of existing communities has been prepared. Specifications for permanent and temporary fence repair and replacement for protection of vegetation recovery from OHV usage have been prepared. These fences will also protect designated Critical Habitat. Tree hazards will be identified and mitigated where found, especially around home sites, roads, and urban interfaces. Collection and spreading of native species seed will also protect designated Critical Habitat from expansion of non-native, undesirable weed and annual species. Specifications are proposed to monitor treatment effectiveness and possible spread of invasives.

Cultural Resources - Two hundred and twenty-two (222) prehistoric archaeological or historic sites are within lands burned by the fires. Of these, sixty-six (66) sites that are potentially eligible to the National Register of Historic Places were assessed for risks from post-fire effects. In addition to these sites, six tribal cemeteries were also assessed for the potential of flooding or erosion. GIS analysis and where needed, pedestrian survey was conducted to assess potential watershed treatments that may have the potential to affect significant cultural resources.

Three of the prehistoric sites evaluated for risks from post-fire runoff events will require stabilization or protection treatments. None of the assessed sites appear to have been subject to fire suppression impacts. With the exception of an abandoned mine and three wells on BLM lands, none of the other assessed sites are in locations proposed for other treatments. Although vegetation mortality is high within

some of the burned area, the assessed sites are located either in restricted access areas or along high visibility corridors. Therefore, the risk from post-fire looting on sites is expected to be low. Two of the six tribal cemeteries assessed by the team will require treatments to prevent flooding and erosion. Four previously unreported sites; two at La Jolla, one at Santa Ysabel, and one on lands owned by the Pala Band in fee were identified during field reconnaissance.

Wildlife - The DOI BAER Team Wildlife Specialist obtained a species list from the Carlsbad Field Office of the U.S. Fish and Wildlife Service. This list was reviewed by representatives from San Diego National Wildlife Refuge, BLM, and BIA. Four federally listed species (Quino checkerspot butterfly, arroyo toad, least Bell's vireo, and southwest willow flycatcher) and one federally threatened species (coastal California gnatcatcher) were determined to occur within the perimeters of the Harris, Witch, and Poomacha Fires. In addition, four of these species (Quino checkerspot butterfly, least Bell's vireo, southwest willow flycatcher, and coastal California gnatcatcher) have designated critical habitat within fire perimeters. Numerous other sensitive species and habitats identified by the Multiple Species Conservation Program and agency lists occur within the fire areas. Although these species may have been potentially affected by the fires, BAER policy only allows for treatment of federally listed species and designated critical habitats (BAER ES Handbook Section 4.2.9).

The effects of the fires, suppression activities, emergency stabilization treatments, and post-fire impacts were assessed through ground and aerial reconnaissance, review of GIS databases, and consultation with species experts. It was determined that all of the listed species addressed were directly or indirectly affected, to some degree, by the wildfires. Suppression actions and emergency stabilization treatment will have minimal effects on populations as a whole. The BAER Wildlife Specialist conducted Section 7 Emergency Consultation with FWS. Through this process, measures to minimize impacts to listed species were incorporated into the BAER plan. Seeding coastal California gnatcatcher and Quino checkerspot butterfly designated critical habitats, with follow up monitoring, were included as treatments to stabilize and prevent further degradation to these areas. Several non-specification recommendations were also developed, including future research needs.

Public Safety and Facilities - Fire impacts on public safety and facilities consist of damage to roadside guard rails and safety and directional signs in the Red Gate Road area of the La Jolla Reservation and the San Miguel Mountain Road area of the San Diego Wildlife Refuge, additional need for boundary and area closure signs on BLM and Refuge lands, increased hazards related to abandoned mines and wells on BLM lands, a damaged power line on the Rincon Reservation, and destroyed weather station, radio repeater, and fire suppression water systems on the Refuge.

Emergency stabilization recommendations include repair or replacement of 2,100 feet of guard rail on tribal lands and 900 feet on Refuge lands, replacement of numerous safety signs and installation of additional signs to help control impacts to critical species habitat, repair of damaged BIA transmission lines, mitigation of hazards associated with exposed mines and wells, and repair or replacement of essential fire suppression and law enforcement facilities on the Refuge.

Environmental Compliance - An environmental compliance document was prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) for the 2007 Southern California Fires. The compliance documentation analyzed reasonably foreseeable individual and cumulative impacts of the treatments identified in the Burned Area Emergency Response Plan. The compliance documentation also evaluated the consistency of the proposed action with federal laws and existing USFWS San Diego National Wildlife Refuge, BIA Southern California Agency, and BLM Palm Springs-South Coast Field Office planning documents and agency policy.

Most treatments proposed on Department of Interior lands met the requirements to be categorically excluded from further NEPA assessment. Herbicidal treatments of invasive species on BIA, BLM, and USFWS lands (Specifications BIA #8, BLM #7, USFWS #3 & 7), seeding of native plants into designated Critical Habitat on BLM and USFWS lands (Specifications BLM #5 and USFWS #5 and 6), and the removal of riprap rocks in one channel location on tribal lands (Specification #18) were evaluated in an Environmental Assessment (EA) for potential to cause significant environmental effects. The EA resulted

in a Finding of No Significant Impact. Compliance documentation is complete pending local agency consultation with the State Historic Preservation Office for compliance with Section 106 on the National Historic Preservation Act regarding some proposed emergency stabilization treatments (Specifications USFWS #9 and BLM # 3 & 8). Depending on the findings of an engineering report now in process, a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers may be needed prior to work performed on the upper channel of an unnamed tributary to Pauma Creek below a reservoir on the Pauma Reservation. Consultation with the USFWS for compliance with Section 7 of the Endangered Species Act regarding emergency stabilization treatments is complete. Any changes to the specifications that take place in habitat of the federally-listed species found within the fires on DOI land will require additional consultation with USFWS.

BURNED AREA EMERGENCY STABILIZATION PLAN

2007 SOCAL FIRES

PART A FIRE LOCATION AND BACKGROUND INFORMATION

Fire Name	Poomacha	Harris	Witch
Fire Number	CA-MVU-010643	CA-MVU-010427	CA-MVU-010432
Fire Code	D1SF	D1TC	D1TD
Jurisdiction	BLM; BIA	BLM; NWS	BIA
Total Acres	49,563	90,345	163,111
Ignition Date/Manner	10/23/2007 Under investigation	10/21/2007 Under Investigation	10/21/2007 Human
Date Contained	11/08/07	10/31/2007	10/31/07
Date Controlled	Not as of plan submission	Not as of plan submission	Not as of plan submission
Region			
State	California	California	California
County	San Diego	San Diego	San Diego

PART B NATURE OF PLAN

Type of Plan (check one box below)

Initial Submission	X
Update and Revising Initial Submission	
Supplying Information For Accomplishment To Date On Work Underway	
Different Phase Of Project Plan	
Final Report (To Comply With The Closure Of The EFR Account)	

EMERGENCY STABILIZATION OBJECTIVES

- Determine need for and to prescribe and implement emergency treatments
- Minimize Threats to Human Life, Safety, and Property
- Identify Threats to Critical Cultural & Natural Resources
- Promptly Stabilize and Prevent Unacceptable Degradation to Resources

BURNED AREA EMERGENCY STABILIZATION PLAN

2007 SOCAL FIRES

PART C - TEAM ORGANIZATION

BAER TEAM MEMBERS

POSITION	TEAM MEMBER / AGENCY
Team Leader	Erv Gasser, NPS Darryl Martinez, BIA_NIFC (trainee) Chris Holbeck, NPS (trainee)
Deputy Team Leader	Harold Luedtke, BIA (Lead) John Perez, NPS
Public Information Officer	Sandee Dingman, NPS Jeanne Klein, BLM
Archaeology	Carla Burnside, USFWS (Lead) Dan Hall, BIA
Vegetation	Mike Dolan, BLM (Lead) Fred VonBonin, BIA Bruce Card, BIA
Hydrologist	Shauna Jensen, BLM – USFS (Lead) Jessica Gould, USFS Rich Pyzik, USFS Judy Hallisey, USFS Chuck Jachens, BOR Jim Roche, NPS Lorri Peltz-Lewis, BOR Dave Mattern, BLM
Geologist	Brian Rasmussen, NPS Annette Parsons, BLM-USFS
Soil Scientist	William Sims, BIA
Wildlife Biologist	Kenneth Griggs, FWS
Environmental Compliance	Jack Oelfke, NPS (Lead) Wendy Poinot, NPS
GIS	Luther Arizana, BIA_NIFC (Lead) Gerald Barnes, BIA_BLM Rachel Endfield, WMAT
Documentation	Wayne Waquiu, BIA

Resource Advisors: (Note: Resource Advisors are individuals who assisted the BAER Team with the preparation of this plan. See the consultations Section of this plan for a full list of agencies and individuals who were consulted or otherwise contributed to the development of this plan.

Name	Affiliation	Specialty
Bodie Shaw	BIA NIFC	NIFC Representative
Tom Branson	BIA NIFC	National BAER Coordinator
Josh Simmons	BIA PAO	Agency Representative
Jay Hinshaw	BIA PRO	Regional BAER Coordinator
Josh Simmons	BIA PRO	Agency Coordinator
Maja Pepion	BIA SCA	Agency BAER Coordinator
Wadell Kanseah	BIA SCA	Agency Representative
Dan Westermeyer	BLM	Natural Resource Specialist
Janaye Byargo	BLM	South Coast Program Manager
Wanda Raschkow	BLM	Archeologist
Dianna Brink	BLM	ESR Coordinator
Greg Hill	BLM	NEPA / Planning
Chuck Whatford	Cal Fire	Archaeologist
Michael W. Klein	Consultant	Biologist/Entomologist
George Wilkins	Consultant	Remote Environmental Monitoring
Kurt Roblek	FWS CFO	Biologist
Nick Valentine	FWS	RO Portland Oregon
Jill Terp	FWS SDNWF	Refuge Manager
John Martin	FWS SDNWF	Wildlife Biologist
Erik Torres	NPS	Information Tech
Larry Wade	SDNWR	AFMO
Rob Roy	La Jolla Band of Luiseno Indian	Environmental Director
Wanda Growing Thunder	La Jolla Band of Luiseno Indians	Cultural Resource Advisor
Shasta Gaughen	Pala Band of Mission Indians	Assistant Director Cupa Cultural Center
Bennae Calac	Pauma Band of Mission Indians	Cultural Resource Advisor
Rodney Kephart	Santa Ysabel Tribe	Cultural Resource Advisor
Andy Yuen	USFWS	Project Leader
Richard Hadley	USFWS	Resource Representative
Randy Nagel	USFWS	GIS Specialist
Miram Morill	USFWS CNO	Public Information Officer
Karen Miranda Gleason	USFWS NIFC	Public Information Officer
Jon E. Keeley	USGS	Station Leader

Resource Advisors (cont): (Note: Resource Advisors are individuals who assisted the BAER Team with the preparation of this plan. See the consultations Section of this plan for a full list of agencies and individuals who were consulted or otherwise contributed to the development of this plan.

Name	Affiliation	Specialty
Albert "Boxie" Phoenix	Barona Band of Mission Indians	Cultural Resource Advisor
Travis Britton	BIA PRO	Rangeland Specialist
David Wooten	BIA PRO	Endangered Species Coordinator
Lisa Northrop	BIA SCA	Natural Resource Program Manager
Carlton Rochester	USGS BRD	Wildlife Biologist
Barbara Kus	USGS BRD	Research Ecologist

BAER SUPPORT PERSONNEL

Name	Affiliation	Specialty
Jon Lee	BIA WRO	Implementation IC
Jay Windyboy	BIA	Contracting Officer
Erik Torres	NPS	Information Tech.
John Miller	NPS	Information Tech.
J. Wayne Brasher	USFS	Ordering Manager
Leigh McDougal	USFS	Ordering Manager
Cheryl Bradford	USFS	Ordering Manager
Laura Conroy	USFS	Ordering Manager
Carol Desilva	USFS	RCDM
Debby Gabriel	USFS	BUYM
Larry A. Lee	USFWS	Admin_Time

CONSULTATIONS

*** SEE INDIVIDUAL RESOURCE ASSESSMENTS APPENDIX I , SECTION V, CONSULTATIONS

**2007 SO CAL FIRES
INTERAGENCY BURNED AREA EMERGENCY STABILIZATION PLAN**

TREATMENT SPECIFICATION	UNIT	UNIT COST	# OF UNITS	Fiscal Year			SPECIFICATION TOTAL
				2008	2009	2010	
HARRIS FIRE							
1-Plan Preparation	Plan		1	\$24,466			\$24,466
2-Implementation Leader	Implementation		1	\$89,320	\$6,840	\$6,840	\$103,000
3-Invasive Weed Treatment	Acres	\$97	3,023	\$292,729			\$292,729
4-Monitor Critical Habitat Treatments	Surveys	\$1,078	64	\$34,512	\$34,512		\$69,024
5-Seed Critical Habitat_CGN	Acres	\$54	3,023	\$163,430			\$163,430
6-Seeding Critical Habitat_QCB	Acres	\$62	1,089	\$67,610			\$67,610
7-Herbicide Treatment	Acres	\$1,392	9	\$12,528			\$12,528
8-Tree Hazard Mitigation	Trees	\$360	8	\$2,878			\$2,878
9-Protective Fence	Miles	\$12,622	22.4	\$282,724			\$282,724
10-Remove Interior Fence	Miles	\$3,200	2.5	\$7,996			\$7,996
11-Replace Boundary Fence	Miles	\$12,758	11.7	\$149,260			\$149,260
12-Replace Boundary/Closures Signs	Signs	\$48	800	\$38,437			\$38,437
13-Construct Asphalt Water Bar	Each	\$800	5	\$4,000			\$4,000
14-Place Road Drain Outlets	Each	\$1,280	3	\$3,840			\$3,840
15-Flood Hazard Signs	Signs	\$207	2	\$414			\$414
16-Spillway Repair	Job	\$15,812	1	\$15,812			\$15,812
17-Road Re-contouring	Job	\$1,450	1	\$1,450			\$1,450
18-Road Debris Removal	Job	\$2,667	4	\$11,080			\$11,080
19-Replace RAWs	RAWs	\$12,148	1	\$12,148			\$12,148
20-Replace Suppression Water System	Water System	\$27,599	2	\$55,198			\$55,198
21-Replace Repeater	Repeater	\$27,593	1	\$27,593			\$27,593
22-Replace Safety Signs/Guardrails	Signs	\$127	2067	\$262,618			\$262,618
TOTAL							\$1,608,235

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Road Safety Signs and Guardrails	PART E FWS Spec-#	22 Replace Safety Signs and Guardrails
NFPORS TREATMENT CATEGORY*	Facility & Infrastructure	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Signs and Structures	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	NA	IMPACTED T&E SPECIES	NA

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>A. General Description: Replace damaged or destroyed road safety signs and guardrails.</p> <p>B. Location/(Suitable) Sites: San Diego National Wildlife Refuge</p> <p>C. Design/Construction Specifications: The cost of replacing signs and guardrails are based on the Region's Real Property Inventory developed by the Regional Engineering Department.</p> <p>D. Purpose of Treatment Specifications (relate to damage/change caused by fire): The signs and guardrails are required for public safety on mountain roads.</p> <p>E. Treatment consistent with Agency Land Management Plan (identify which plan): The signs are included in the refuges Real Property Inventory, Management Plan, and Fire Management Plan as essential mission critical facilities.</p> <p>F. Treatment Effectiveness Monitoring Proposed: The treatment will be considered successful when the signs and guardrails are back in place to protect public safety.</p>
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LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Project Inspector: GS-11 @ \$36.69/hr X 8 hrs/day X 2 days X 1 year	\$587
TOTAL PERSONNEL SERVICE COST	\$587
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
2 Flooded During Storms Signs X \$55 ea.	\$ 110
20 15 MPH Speed Limit Signs X \$50 ea.	\$ 1,000
4 25 MPH Speed Limit Signs X \$50 ea.	\$ 200
20 Safety Chevron Signs X \$55 Ea.	\$ 1,100
2 Safety Curve Arrow Signs X \$55 ea.	\$ 110
2 No Trespassing Signs X \$30 ea.	\$ 60
16 No Parking Along Road Signs X 40 ea.	\$ 640
66 Posts for Signs X \$8.50	\$ 561
1000 Carsonite Reflectors X \$25 ea.	\$ 25,000
TOTAL MATERIALS AND SUPPLY COST	\$ 28,781
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Contractor removes debris from and provides all materials and labor to construct new boundary signs	\$ 4,500
915 feet of Guardrail X \$250 / linear foot installed by Contractor (includes all material)	\$228,750
TOTAL CONTRACT COST	\$ 233,250

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
2008	12/01/2007	03/01/2008	C	Signs	\$127	2067	\$262,618
TOTAL							\$262,618

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	M,C
3. Estimate supported by cost guides from independent sources or other federal agencies	E
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Public Safety and Facilities Assessment, Appendix I.

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$262,618		2067	\$262,618
TOTAL COST		\$262,618			\$262,618

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	FWS Emergency Stabilization Plan Preparation	PART E FWS Spec-	1_Plan Preparation
NFPORS TREATMENT CATEGORY*	Planning	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	ES/BAER Plan NEPA EA Prescription Design	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	N/A	IMPACTED T&E SPECIES	N/A

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

A. General Description: Plan preparation of the Burned Area Emergency Response Emergency Stabilization Plan for the lands impacted by the 2007 SoCal Fires.

B. Location/(Suitable) Sites: US Fish and Wildlife Service , San Diego National Wildlife Refuge Complex lands impacted by the 2007 SoCal Fires consisting of 4,137 acres

C. Design/Construction Specifications:

1. Conduct a detailed assessment of soil burn severity, its impacts to lands and the threats to life and property, protect critical cultural and natural resources, mitigate impacts to cultural and natural resources, and assess and mitigate suppression impacts.
2. Write emergency stabilization treatment specifications based on aerial and ground reconnaissance, and consultations with local specialists. Treatments must meet objectives of approved land management plans.
3. Write resource assessments justifying treatments, identifying issues, observations, findings, and recommendations.
4. Prepare GIS maps for BAER Plan and presentations.
5. Print/copy plan in hardcopy and on CDs.
6. Submit plan and documentation to Field Manager.

D. Purpose of Treatment Specifications (relate to damage/change caused by fire): The purpose is to prepare a comprehensive ES plan to manage or mitigate the fire impacts in order to protect life and property and protect cultural and natural resources. Emergency stabilization actions will be based on a plan developed immediately post-fire.

E. Treatment consistent with Agency Land Management Plan (identify which plan): Treatment Consistent with Southern California Fire Management Plan

F. Treatment Effectiveness Monitoring Proposed: The plan details monitoring for treatment effectiveness as prescribed for each treatment specification. Final report will be prepared to document the treatment monitoring.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
BAER Team members personnel services:	
Team member x \$28.73 x 120 hours	\$6,895
Team member x \$43.09oT x 175	\$15,081
TOTAL PERSONNEL SERVICE COST	\$21,976
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	

TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
BAER Team Travel:	
Airfare x 2	\$981
Vehicle Rental x 2	\$1,142
Fuel x 2	\$367
TOTAL TRAVEL COST	\$2,490
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
TOTAL CONTRACT COST	

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
2008	10-28-07	11-16-07		Plan			\$24,466
TOTAL							\$24,466

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

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TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS (7%)		4,137 acres			
TOTAL COST		\$24,466			\$24,466

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Implementation Leader	PART E FWS Spec-#	#2_Implementation Leader
NFPORS TREATMENT CATEGORY*	Administration	FISCAL YEAR(S) (list each year):	2008, 2009, 2010
NFPORS TREATMENT TYPE *	Contract Administration	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	NA	IMPACTED T&E SPECIES	NA

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

- A. General Description:** Hire GS-11 Implementation leader for 12 months to develop contracts, monitor contract performance, manage budget, and produce accomplishment reports for all FWS Emergency Stabilization Treatments on San Diego NWR. Administrative duties during the second and third year will be performed by assigned staff.
- B. Location/(Suitable) Sites:** San Diego National Wildlife Refuge
- C. Design/Construction Specifications:** See other treatment specifications.
- D. Purpose of Treatment Specifications (relate to damage/change caused by fire):** The implementation leader will develop contracts, coordinate contractor access, manage budget, and complete accomplishment reports.
- E. Treatment consistent with Agency Land Management Plan (identify which plan):** All treatments proposed are consistent with Management Plan and Fire Management Plan.
- F. Treatment Effectiveness Monitoring Proposed:** If projects are completed on time and within budget this treatment will be considered successful.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Project Inspector: GS-11/5 @ \$3,320/pay period X 26 pay periods X 1 Fiscal Year =	\$86,320
Project Inspector: GS-11/5 @ \$3,320/pay period X 2 pay periods X 2 Fiscal Years =	\$13,280
TOTAL PERSONNEL SERVICE COST	\$99,600
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
Misc. Supplies x 1 Year	\$3,000
Misc. Supplies: \$200/Yr x 2 Year	\$400
TOTAL MATERIALS AND SUPPLY COST	\$3,400
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
TOTAL CONTRACT COST	

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
2008	12/01/07	12/01/08	C	Implementation	\$86,320	1	\$89,320
2009	10/01/08	9/30/09	C	Implementation	\$6,640	1	\$6,840
2010	10/01/09	9/30/09	C	Implementation	\$6,640	1	\$6,840
TOTAL							\$103,000

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	M,C
3. Estimate supported by cost guides from independent sources or other federal agencies	E
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Executive Summary

TOTAL COST BY JURSDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$103,000			\$103,000
TOTAL COST		\$103,000			\$103,000

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Invasive Weed Treatment	PART E FWS Spec-#	#3 FWS Invasive Weed Treatment
NFPORS TREATMENT CATEGORY*	Invasive species	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Chemical treatment	WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	Coastal California gnatcatcher, Quino checkerspot butterfly, Otay tarplant

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>A. General Description: Selectively treat exotic plants with 2% glyphosate solution applied with backpack sprayers.</p> <p>B. Location/(Suitable) Sites: 3,023 acres in burned areas of coastal sage scrub on San Diego National Wildlife Refuge (SDNWR).</p> <p>C. Design/Construction Specifications:</p> <ol style="list-style-type: none"> Starting approximately 2-3 weeks after the first significant rain event of the 2007-2008 rainy season (likely mid-late-November) assess germination of exotic weeds (e.g., <i>Erodium cicutarium</i>, <i>Avena sp.</i>, <i>Brassica nigra</i>, <i>Centaurea melitensis</i>). When first cohort of weeds has reached approximately 10 cm tall, treat with 2% glyphosate, using backpack sprayers or compressor truck-mounted hoses. Applicators must be familiar with native coastal sage scrub species, and avoid spraying them to the greatest extent practicable; Monitor site for effectiveness of initial treatment, and for germination of successive cohorts of weeds in response to subsequent rain events; When subsequent cohorts of weeds reach 10-20 cm tall, treat as described in specification number 2. Repeat steps 2-4 up to four times. <p>D. Purpose of Treatment Specifications (relate to damage/change caused by fire): Control spread of non-native invasive species into susceptible burned designated critical habitat. Protect the ecological integrity and productivity of designated critical habitat supporting 3 federally listed animal species and at least one listed plant species on lands administered by the SDNWR.</p> <p>E. Treatment consistent with Agency Land Management Plan (identify which plan): Environmental Assessment and Land Protection Plan for Otay-Sweetwater Unit of San Diego National Wildlife Refuge, San Diego County, California; SDNWR Fire Management Plan.</p> <p>F. Treatment Effectiveness Monitoring Proposed: Monthly visual reconnaissance, comparison with unburned coastal sage scrub within 0.1-3 km of burned area (at Rancho San Diego ridge and Los Montanas areas of SDNWR).</p>	
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LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Project Biologist: (1) GS-11 PFT @ \$2,528/PP x 2 PP =	\$5,056
Contracting and Personnel Services Overhead (Approx. 20 percent of basic project cost)	\$46,303
TOTAL PERSONNEL SERVICE COST	\$51,359
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
Misc. equipment (backpack sprayers, PPE, etc.)	\$1,000
GSA Vehicle (one month x \$400/month)	\$400
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$1,400
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
Herbicide (glyphosate [Roundup]) \$35/gallon x 386 gallons	\$13,510
TOTAL MATERIALS AND SUPPLY COST	\$13,510
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Crew Leader (1 person @ \$31.34/hour x 14 pay periods) =	\$35,100
Field Crew (8 persons @ \$23.00/hour x 13 pay periods) =	\$191,360

TOTAL CONTRACT COST	\$226,460

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
2008	12/01/2007	09/30/2008	S	Acres	\$96.84	3,023	\$292,729
TOTAL							\$292,729

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	P, C
3. Estimate supported by cost guides from independent sources or other federal agencies	
4. Estimates based upon government wage rates and material cost.	P, M
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

Environmental Assessment and Land Protection Plan for Otay-Sweetwater Unit of San Diego National Wildlife Refuge, San Diego County, California; SDNWR Fire Management Plan. See Appendix I, Vegetation Resource Assessment; See Appendix IV, Vegetation Treatment Map.

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$96.84		3,023 acres	\$292,729
TOTAL COST					\$292,729

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Monitoring Critical Habitat Treatments	PART E FWS Spec-#	#4 FWS Monitoring Critical Habitat Treatments
NFPORS TREATMENT CATEGORY*	Monitoring	FISCAL YEAR(S) (list each year):	2008, 2009
NFPORS TREATMENT TYPE *	Treatment Effectiveness Monitoring	WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	Quino Checkerspot Butterfly, Coastal California gnatcatcher

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

- A. General Description:** Monitoring effectiveness of invasive weed treatments and re-seeding to recover Quino checkerspot butterfly, coastal California gnatcatcher, and least Bell's vireo designated Critical Habitats. Monitoring actions to stabilize designated critical habitat is needed to determine if further recovery actions are needed. In addition, monitoring of Quino checkerspot butterfly mortality and loss of population resilience caused by the fire will be conducted to determine if butterflies are responding to treatments and if further measures are needed (e.g. butterfly ranching; reintroduction of captive reared larvae).
- B. Location/(Suitable) Sites:** Monitoring of invasive weed treatments and re-seeding efforts will be conducted in all areas where these treatments were applied (see FWS Weed Treatment and Critical Habitat Seeding Specifications for a description of locations). Monitoring of QCB mortality and population resilience will be conducted on all U.S. Fish and Wildlife Service lands with designated critical habitat, in the Southwestern San Diego Recovery Unit, within the Harris Fire perimeter.
- C. Design/Construction Specifications:** All monitoring will follow established protocols and utilize proven techniques used by resource professionals. All sampling should be stratified across the burned landscape to account for variation in topography, soil types, treatment techniques, etc. A final report will be published that documents sampling methodologies, techniques, areas sampled, and summary of findings.
5. Invasive Weed Treatment Monitoring
 - a. Timing of monitoring will be contingent on the phenology of invasive species identified for treatment. Once monitoring commences surveys should be conducted bi-weekly throughout the growing season.
 - b. Photo points, and pre and post treatment survival checks of infested areas will be conducted to determine treatment effectiveness.
 - c. Description of the distribution and quantity of noxious weeds in burned areas will focus treatments and determine if further stabilization measures are needed.
 6. Re-seeding Monitoring
 - a. Sampling is designed to determine seedling density and vegetative species composition.
 - b. Sampling will be conducted bi-weekly after germination throughout the growing season.
 - c. Transects with quadrats to determine seedling density should be established in seeded areas and non-seeded (control) areas to evaluate treatment effectiveness
 - d. Use line intercept or point intercept methodologies to determine species composition and percent cover.
 - e. Comparisons of seedling density, species percent cover, and composition should be made between seeded and unseeded sites in order to evaluate treatment effectiveness.
 - f. Observations should be documented both in written and photographic documents to record other factors such as herbivory, surface erosion, etc.
 7. QCB mortality/population resilience monitoring
 - a. Surveys will begin at the beginning of the QCB flight season and occur weekly for 5 weeks.
 - b. Surveys will occur within 5 known occurrence complexes and suitable habitat within 200 meters of mapped occurrence complexes (see Wildlife Treatment Map, Appendix IV). Surveys will cover all known QCB locations, host plant populations, and hilltops within suitable sites.
 - c. All surveys will follow standard protocols approved by U.S. Fish and Wildlife Service
 - d. If no QCB are detected within suitable, known sites, butterfly ranching (i.e. captive breeding and translocation) will be recommended to help re-establish population resilience.
- D. Purpose of Treatment Specifications (relate to damage/change caused by fire):** Monitoring of invasive weed treatment and re-seeding effort in designated critical habitat is necessary to determine the effectiveness of stabilization/recovery actions in these areas. The Harris Fire impacted 23 percent of all designated critical habitat for the QCB. Quantifying reduction of invasive weeds, colonization of burned areas, and seedling density and establishment are important metrics for documenting recovery of designated critical habitat.

The federally endangered QCB is endemic to San Diego and Riverside counties and northern Baja California, Mexico. Drought and habitat loss have severely reduced the abundance and distribution of populations. The populations and critical habitat affected by the fire represent a significant portion of the remaining distribution. Within the Southwest San Diego Recovery Unit, the Harris Fire affected 36% and 75% of all Quino occurrences locations and QCB Complexes, respectively. In addition 50% of the entire SW San Diego Recovery Unit burned and 61% of the designated critical habitat within the recovery unit burned. It is possible that the butterflies in the diapause phase of their lifecycle were killed by the fire. Because this is a federally listed endangered species, it is critical to determine mortality and possible loss of population resiliency. If decreased QCB numbers reduce population resiliency and the population is not expected to recover without assistance, the next step would be to recommend butterfly ranching (i.e. propagation and translocation) to prevent loss of the species.

E. Treatment consistent with Agency Land Management Plan (identify which plan): San Diego NWR Complex Fire Management Plan (2004), pages 58-59.

F. Treatment Effectiveness Monitoring Proposed: Monitoring treatment effectiveness will be crucial in determining if further actions are needed to stabilize/recover designated critical habitat areas. The techniques described above will provide information on reduction of invasive weeds, identify new weed colonization, and quantify seedling establishment. With this information land managers will be able to more accurately evaluate the stabilization/recovery of designated critical habitat, and determine if supplemental actions should be taken. Additional stabilization actions taken on designated critical habitat may include additional seeding or changes to seed mixes and invasive weed control in new areas or re-application in previously treated areas.

Monitoring of the QCB and associated designated critical habitat will be conducted in accordance with established protocols (see protocol in supporting documentation). If the number of QCB is low or it has been extirpated from known habitats within the fire area, a supplemental funding request will be initiated to conduct ranching of QCB.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Invasive/Seeding Monitoring: GS-11/ 5 Wildlife Biologist @ \$245.60/day X 18 days X 2 years	\$8,842
Invasive/Seeding Monitoring: GS-7/5 Biological Technician @ \$146.00 X 36 days X 2 personnel X 2 years	\$21,082
Contracting and Personnel Services Overhead (20% of \$30,000 Contracting Costs)	\$6,000
TOTAL PERSONNEL SERVICE COST	\$35,924
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
GSA vehicle lease for GS-11 Wildlife Biologist @ \$400.00/month X 1.5 months X 2 years	\$1200
GSA vehicle lease for GS-7 Biological Techs @ \$400.00/month X 3 months X 2 years	\$2400
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$3,600
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
Trimble GPS Units w/software @ \$4000.00 X 1 units	\$4000
Misc field supplies	\$1000
Misc office supplies	\$500
TOTAL MATERIALS AND SUPPLY COST	\$5,500
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
QCB Monitoring: Contractor to survey 1 site/day X 6 sites X 5 visits per site= 30 days @ 8hrs/day X \$100.00/hr (high costs include overhead and reflect need for contractor to have specialized skills and be permitted by FWS to conduct surveys)	\$24,000
TOTAL CONTRACT COST	\$24,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY 08	02/01/2008	09/30/2008	F, C	surveys	\$1,078	32 surveys	\$34,512
FY 09	02/01/2009	09/30/2009	F, C	surveys	\$1,078	32 surveys	\$34,512
TOTAL							\$69,024

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	P, C

3. Estimate supported by cost guides from independent sources or other federal agencies	
4. Estimates based upon government wage rates and material cost.	P, M
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

BAER Wildlife Assessment, Quino Checkerspot Butterfly Survey Protocol. See Appendix I, Vegetation Resource Assessment; See Appendix IV, USFWS Recovery Plan for Quino Checkerspot Butterfly (2005); Vegetation Treatment Map.

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$1,078		64 surveys	\$69,024
TOTAL COST					\$69,024

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Seed Gnatcatcher Critical Habitat	PART E FWS Spec-#	#5 FWS Seed Critical Habitat CGN
NFPORS TREATMENT CATEGORY*	Invasive species	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Native seed collection Prevention (seeding)	WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	Coastal California gnatcatcher, Quino checkerspot butterfly, Otay tarplant

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>A. General Description: Collect seed of <i>Artemisia californica</i>, <i>Eriogonum fasciculatum</i>, <i>Salvia munzii</i>, <i>Salvia apiana</i>, <i>Viguiera laciniata</i>, <i>Nassella pulchra</i>, <i>Muhlenbergia rigens</i>, <i>Rhamnus crocea</i>, <i>Plantago erecta</i>, and other native coastal sage scrub species as appropriate, from area surrounding burned site. Distribution (by broadcast seeding, hand or mechanical) of collected seed in burned areas, as appropriate.</p> <p>B. Location/(Suitable) Sites: San Diego National Wildlife Refuge (SDNWR) within 10 km of the site.</p> <p>C. Design/Construction Specifications:</p> <ol style="list-style-type: none"> 1. Collect approximately 10,000 pounds of native seed of species listed above and other appropriate species as determined in consultation with SDNWR Biologist. 2. Monitor donor plant phenology starting March 2008. Begin collecting seed when viable seed is mature. Time of maturation (and thus collection) will differ among species. Some seeds will likely be ready for collection in May 2008. 3. Seeds will be rough-cleaned, labeled, and stored in an area reasonably safe from insects, rodents, fire, and moisture. 4. Seeds will be distributed on the California gnatcatcher critical habitat areas indicated in the Appendix in July-October 2008, at a rate of approximately 3.3 lbs per acre and allowed to grow <i>in situ</i> taking advantage of natural rains. <p>D. Purpose of Treatment Specifications (relate to damage/change caused by fire): Complete emergency stabilization of critical habitat of federally threatened coastal California gnatcatcher that would not likely recovery on its own. Ensure availability of diverse moderately dense native coastal sage scrub plant community in historically occupied areas. After the 2003 Otay Mountain Fire the Diegan coastal sage scrub habitat within the burned area did not recovery to its original integrity. Seeding efforts in other Diegan coastal sage scrub recovery projects through San Diego County have demonstrated that this methodology is a highly successful treatment. See references below.</p> <p>E. Treatment consistent with Agency Land Management Plan (identify which plan): Environmental Assessment and Land Protection Plan for Otay-Sweetwater Unit of San Diego National Wildlife Refuge, San Diego County, California</p> <p>F. Treatment Effectiveness Monitoring Proposed: Monthly visual reconnaissance, comparison with unburned coastal sage scrub within 0.1-3 km of burned area (at Rancho San Diego ridge and Los Montanas areas of SDNWR).</p>

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Project Manager: (1) GS-11/5 @ \$2,528/ Pay period X 2 Pay periods =	\$5,056
Contracting and Personnel Services Overhead (20 percent of personnel and contract project cost)	\$27,172
TOTAL PERSONNEL SERVICE COST	\$32,228
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
GSA Vehicle Lease for Project Manager \$400/month x 1 month	\$400
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$400
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	

Collection surveys and supervision - \$35.00/hour X 480 hours	\$16,800
Seed Collection - \$28.00/hour X 1,920 hours	\$53,760
Seed cleaning and storage - \$28.00/hour X 640 hours (4 weeks X 4 collectors)	\$17,920
Seed distribution – ½ hour/acre X \$28.00/hour X 3,023 acres	\$42,322
TOTAL CONTRACT COST	\$130,802

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
2008	03/01/2008	11/01/2008	S	Acres	\$54.07	3,023	\$163,430
TOTAL							\$163,430

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	P, C
3. Estimate supported by cost guides from independent sources or other federal agencies	
4. Estimates based upon government wage rates and material cost.	P, M
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

References: Coastal sage scrub restoration sites: Talega Development (Nob Hill Restoration); Santa Margarita Water District (Pipeline in Arroyo Trabuco Creek); Chiquita Canyon High School Slopes Restoration, Orange County CA. See Appendix I, Vegetation Resource Assessment; See Appendix IV, Vegetation Resource Map.

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$54.07		3,023 acres	\$163,430
TOTAL COST					\$163,430

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Seeding Quino Critical Habitat	PART E FWS Spec-#	#6 FWS Seeding Critical Habitat QCB
NFPORS TREATMENT CATEGORY*	Invasive species	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Native seed collection Prevention (seeding)	WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	Quino checkerspot butterfly, Otay tarplant, Coastal California gnatcatcher

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>A. General Description: Collect seed of Quino checkerspot butterfly larval host plants (<i>Plantago erecta</i>, <i>Castilleja exserta</i>, <i>Antirrhinum coulterianum</i>) and appropriate native nectar-producing species (e.g., <i>Lasthenia californica</i>, <i>Dichelostemma capitatum</i>, <i>Plagiobothrys sp.</i>, <i>Cryptantha sp.</i>, <i>Linanthus dianthiflorus</i>, <i>Lupinus bicolor</i>, <i>Mirabilis californica</i>, <i>Amsinckia sp.</i>, <i>Phacelia sp.</i>, <i>Allium sp.</i>) and other species as appropriate, from area surrounding burned site. Distribution (by broadcast seeding, hand or mechanical) of collected seed in burned areas, as appropriate, on approximately 1089 acres of critical habitat.</p>	
<p>B. Location/(Suitable) Sites: San Diego National Wildlife Refuge (SDNWR) within 10 km of the site.</p>	
<p>C. Design/Construction Specifications:</p> <ol style="list-style-type: none"> 1. Collect approximately 2,500 pounds of native seed of species listed above and other appropriate species as determined in consultation with SDNWR Biologist. 2. Monitor donor plant phenology starting March 2008. Begin collecting seed when viable seed is mature. Time of maturation (and thus collection) will differ among species. Some seeds will likely be ready for collection in May 2008. 3. Seeds will be rough-cleaned, labeled, and stored in an area reasonably safe from insects, rodents, fire, and moisture. 4. Seeds will be distributed on the Quino checkerspot butterfly habitat sites indicated in the Appendix in July-October 2008, allowed to grow <i>in situ</i> taking advantage of natural rains at the rate of approximately 2.3 lbs/acre on 1,089 acres. 	
<p>D. Purpose of Treatment Specifications (relate to damage/change caused by fire): Rehabilitate critical habitat of federally endangered Quino checkerspot butterfly. Ensure availability of larval host plants (<i>Plantago erecta</i>, <i>Castilleja exserta</i>) and appropriate native nectar-producing species(e.g., <i>Lasthenia californica</i>, <i>Dichelostemma capitatum</i>, <i>Plagiobothrys sp.</i>, <i>Cryptantha sp.</i>, <i>Linanthus dianthiflorus</i>, <i>Lupinus bicolor</i>, <i>Mirabilis californica</i>, <i>Amsinckia sp.</i>, <i>Phacelia sp.</i>, <i>Allium sp.</i>) at sites with prime topography for the species (hilltops) at or near currently or historically occupied areas.</p>	
<p>E. Treatment consistent with Agency Land Management Plan (identify which plan): Environmental Assessment and Land Protection Plan for Otay-Sweetwater Unit of San Diego National Wildlife Refuge, San Diego County, California</p>	
<p>F. Treatment Effectiveness Monitoring Proposed: Monthly visual reconnaissance, comparison with unburned butterfly-inhabited hilltops within 0.1-3 km of burned area (at Rancho San Diego ridge and Los Montanas areas of SDNWR).</p>	

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Project Manager: (1) GS-11 PFT @ \$2,528/PP X 1 PP =	\$2,528
Contracting and Personnel Services Overhead (20 percent of personnel and contract project cost)	\$11,202
TOTAL PERSONNEL SERVICE COST	\$13,730
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
GSA Vehicle Lease for Project Manager \$400/month x 1 month	\$400
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$400
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	

TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Collection surveys and supervision - \$35.00/hour X 120 hours	\$4,200
Seed Collection - \$28.00/hour X 480 hours	\$13,440
Seed cleaning and storage: \$28.00/hour X 160	\$4,480
Seed distribution - \$28.00/hour X 1,120 hours	\$31,360
TOTAL CONTRACT COST	\$53,480

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
2008	03/01/2008	11/01/2008	S	Acres	\$62	1,089	\$67,610
TOTAL							\$67,610

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	P, C
3. Estimate supported by cost guides from independent sources or other federal agencies	
4. Estimates based upon government wage rates and material cost.	P, M
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

BAER Wildlife Assessment, Appendix I; Quino Checkerspot Butterfly Recovery Plan; Border Patrol Mitigation Project. See Appendix I, Vegetation Resource Assessment; See Appendix IV, Vegetation Treatment Map.

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$62		1,089 acres	\$67,610
TOTAL COST					\$67,610

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Herbicide Treatment	PART E FWS Spec-#	#7 FWS Herbicide Treatment
NFPORS TREATMENT CATEGORY*	Invasive species	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Chemical treatment	WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	Least Bell's vireo, coastal California gnatcatcher

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>A. General Description: Cut-stump treat tamarisk and other woody exotic plants with undiluted garlon or other triclopyr formulation with a surfactant.</p> <p>B. Location/(Suitable) Sites: 9 ac in 3 polygons in burned areas of southern willow scrub and southern mixed chaparral on moderate slopes on San Diego National Wildlife Refuge (SDNWR).</p> <p>C. Design/Construction Specifications:</p> <ol style="list-style-type: none"> Cut stems of tamarisk in designated areas. Paint cut stumps with undiluted garlon and surfactant, or commercial triclopyr preparation with surfactant (e.g., Pathfinder II). Monitor effectiveness of treatment by revisiting cut stumps 4 months after treatment and examining them for re-sprouts. If re-sprouts are present, repeat step 1. <p>D. Purpose of Treatment Specifications (relate to damage/change caused by fire): Control spread of non-native invasive species into susceptible burned areas that will convert the native plant community. Protect the ecological integrity and productivity of designated critical habitat supporting 2 federally listed animal species on lands administered by the SDNWR.</p> <p>E. Treatment consistent with Agency Land Management Plan (identify which plan): Environmental Assessment and Land Protection Plan for Otay-Sweetwater Unit of San Diego National Wildlife Refuge, San Diego County, California</p> <p>F. Treatment Effectiveness Monitoring Proposed: Revisit sites 4 months after treatment and examine treated stumps for re-sprouts.</p>

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Project Biologist: GS-11/5 PFT @ \$2,528/PP x 1 PP =	\$2,528
TOTAL PERSONNEL SERVICE COST	\$2,528
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Contractors time and materials	\$10,000
TOTAL CONTRACT COST	\$10,000

SPECIFICATION COST SUMMARY

FISCAL	PLANNED	PLANNED COMPLETION	WORK	UNITS	UNIT	PLANNED	PLANNED
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YEAR	INITIATION DATE (M/D/YYYY)	DATE (M/D/YYYY)	AGENT		COST	ACCOMPLISHMENTS	COST
2008	12/01/2007	09/30/2008	S	Acres	\$1,392	9	\$12,528
TOTAL							\$12,528

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	C
3. Estimate supported by cost guides from independent sources or other federal agencies	
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Appendix I, Vegetation Resource Assessment; See Appendix IV, Vegetation Treatment Map.
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TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$1,392		9	\$12,528
TOTAL COST					\$12,528

PART F - INDIVIDUAL SPECIFICATION

TREATMENT/ACTIVITY NAME	Tree Hazard Mitigation	PART E FWS Spec-#	#8 FWS Tree Hazard Mitigation
NFPORS TREATMENT CATEGORY	Roads	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE	Hazard Removal	WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	N/A

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>A. General Description: Mitigate tree hazards identified on the San Miguel Mountain Road, within the San Diego National Wildlife Refuge.</p> <p>B. Location/(Suitable) Sites: San Miguel Mountain Road</p> <p>C. Design/Construction Specifications:</p> <ol style="list-style-type: none"> 1. Identified and flagged tree hazards that are likely to reach the road are to be felled. 2. All trees felled will be limbed and bucked. Slash will be scattered to provide soil stabilization. <p>D. Purpose of Treatment Specifications: Mitigate potential threats affecting use of San Miguel Road.</p> <p>E. Treatment Consistent with Agency Land Management Plan: N/A</p> <p>F. Treatment Effectiveness Monitoring Proposed: Project Manager oversight will ensure treatments are carried out in accordance with design criteria. This specification should be modified should more tree hazards be identified above the initial estimate of this specification.</p>

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
GS-5 Faller/Swampers: 2 laborers X \$16.74/hour X 8 hours/day X 2 days	\$536
GS-6 Faller/Swampers: 2 laborers X \$18.67/hour X 8 hours/day X 2 days	\$597
GS-8 Supervisor (working): 2 supervisors x \$22.97/hour X 8 hours/day X 2 days	\$735
TOTAL PERSONNEL SERVICE COST	\$1868
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	COST / ITEM
Saws: 1 saw at \$650/saw	\$650
Crew GSA Vehicle (4WD Crew Cab): [(\$314/month X .25 months) + (\$0.32/mile X 100 miles)]	\$110
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$760
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	COST / ITEM
Saw Gas, Oil, Chain, etc.	\$250
TOTAL MATERIALS AND SUPPLY COST	\$250
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	COST / ITEM
TOTAL CONTRACT COST	\$0

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY08	11/15/2007	11/16/2007	F	Trees	\$360	8	\$2,878
FY							
TOTAL							\$2,878

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1.	Estimate obtained from 2-3 independent contractual sources.	
2.	Documented cost figures from similar project work obtained from local agency sources.	E

3.	Estimate supported by cost guides from independent sources or other federal agencies	
4.	Estimates based upon government wage rates and material cost.	M, P
5.	No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment, **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Appendix I, Vegetation Resource Assessment; See Appendix IV, Vegetation Treatment Map.

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$360		8	\$2,878
TOTAL COST					\$2,878

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	New Temporary Protective Fence	PART E FWS Spec-#	#9 FWS Protective Fence
NFPORS TREATMENT CATEGORY*	Facility & Infrastructure	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Fence Replacement	WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	Coastal California gnatcatcher, Otay tarplant, and Quino checkerspot butterfly

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

- A. General Description:** Construct approximately 22.4 miles of new temporary fence on San Diego National Wildlife Refuge burned by the Harris Fire. Prior to the Harris Fire dense mature vegetation restricted access in the San Diego National Wildlife Refuge. This vegetation was destroyed by the fire and the lands are now barren and open to OHV traffic and livestock on adjoining lands. Fences will be used to protect designated Critical Habitat for the California gnatcatcher, Otay tarplant and Quino checkerspot butterfly from OHV traffic and to allow for natural recovery of vegetation.
- B. Location/(Suitable) Sites:** Fences are to be established on Refuge boundary and along fire perimeter. See Vegetation Treatment Map, Appendix IV for exact locations.
- C. Design/Construction Specifications:** Fence construction shall be in accordance with standard design specifications.
11. New fence materials shall be utilized
 12. Construct 4-wire fence for San Diego National Wildlife Refuge boundary consisting of 3 strands of 12 ½ gauge twisted barbed wire and a bottom strand of 12 ½ gauge twisted smooth wire. Steel 6 foot T-posts shall be driven 1 ½ feet in the ground and spaced at 16 ½ feet apart.
 13. Steel posts (stress panels) as recommended shall be placed at all corners or at a maximum of ¼ mile spacing or as necessary to compensate for topographical undulations. Posts are to be secured using 12 ½ gauge smooth twisted steel wire with a minimum breaking strength of 950 pounds of force.
 14. Additional specifications regarding fence replacement will be provided at time of reconstruction initiation.
 15. Remove all burned fence materials from the area, including wire, staples, and nails.
 16. Install pre-fabricated gates at exterior boundary access locations.
 17. Thirty tons of boulders, weighing approximately ½ ton each, will be placed at strategic locations on both sides of gates to prevent OHV access around exterior Refuge closures. Boulders will be placed as soon as possible after fences and gates are erected.
- a. Purpose of Treatment Specifications (relate to damage/change caused by fire):** Protective fences may be constructed using emergency stabilization funds to protect burned areas (from impacts from wildlife, domestic wildlife, or humans and for health and safety of agency personnel and the public) during the recovery period for burned vegetation or the establishment period for new seedlings.
- b. Treatment consistent with Agency Land Management Plan (identify which plan):** The boundary fence is required to maintain the refuges closure to the public and provide for natural recovery and protection of the Federal Endangered/Threatened California gnatcatcher, Quino checkerspot butterfly, and Otay tarplant.
- F. Treatment Effectiveness Monitoring Proposed:** The treatment will be considered successful if OHV's and livestock are excluded from the burned areas during the prescribed recovery period.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Contracting Officer: GS-11/5 @ \$41.60/hr. X 8 hrs./day X 3 days X 1 year	\$999
Project COR: GS-11/5 @ \$41.60/hr. X 8 hrs./day X 10 days X 1 year	\$3,328
Project Inspector: GS-11/5 @ \$41.60/hr. X 8 hrs./day X 28 days X 1 year	\$9,319
TOTAL PERSONNEL SERVICE COST	\$13,646
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
Vehicle for Project COR @ \$200/week X 2 weeks X 1 year	\$400
Vehicle for Project Inspector @ \$200/week X 6 weeks X 1 year	\$1,200
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$1,600
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
12 ½ gauge galvanized twisted two-point barbed wire: \$65.63/roll X 12 rolls/mile X 22.4 miles X 1 year	\$17,642
12 ½ gauge galvanized twisted smooth wire: \$54.00/roll X 4 rolls/mile X 22.4 miles X 1 year	\$4,839

6 foot steel painted T-posts: \$3.71/post X 320 posts/mile X 22.4 miles X 1 year	\$26,594
36 " wire fence stays: \$21.90/bundle X 6.4 bundles/mile X 22.4 miles X 1 year	\$3,140
Wire fence clips (50/pk): \$1.69/pk X 26 pks/mile x 22.4 miles X 1 year	\$985
Pre-fabricated Gate: 4 gates @ \$900/gate X 1 year	\$3,600
Steel Pipe (2 3/8" X 7"): \$14.78/pipe X 12 pipes/mile X 22.4 miles X 1 year	\$3,973
Steel Pipe (1 5/8" X 7"): \$9.10/pipe X 8 pipes/mile X 22.4 miles X 1 year	\$1,631
Galvanized brace bands (2 1/4" heavy): \$0.44/band X 14 bands/mile X 22.4 miles X 1 year	\$138
Carriage bolts and nuts (3/8 x 1 1/2"): \$0.08/each X 14/mile X 22.4 miles X 1 year	\$26
3-5 foot Boulders @ \$65.00/ton delivered X 30 tons X 1 year	\$1,950
TOTAL MATERIALS AND SUPPLY COST	\$64,518
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Fencing cost for installation: \$7,000/mile X 22.4 miles X 1 year	\$156,800
Fencing cost for removal of burned materials: \$2,000/mile X 22.4 miles X 1 year	\$44,800
Backhoe (Operator and Fuel included) to place boulders: \$85.00/hr. X 8 hrs./day X 2 days X 1 year	\$1,360
TOTAL CONTRACT COST	\$202,960

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY 08	12/01/2007	09/30/2008	S	Miles	\$12,622	22.4	\$282,724
TOTAL							\$282,724

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	M, C
3. Estimate supported by cost guides from independent sources or other federal agencies	E
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Appendix I, Vegetation Resource Assessment; See Appendix IV, Vegetation Treatment Map.

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$12,622		22.4 miles	\$282,724
TOTAL COST					\$282,724

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Remove Burnt Interior Fence	PART E FWS Spec-#	#10 FWS Remove Interior Fence
NFPORS TREATMENT CATEGORY*	Facility & Infrastructure	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Fence Replacement	WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	Coastal California gnatcatcher, Quino checkerspot butterfly

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

- A. General Description:** Remove approximately 2.5 miles of interior fencing on the San Diego National Wildlife Refuge that was damaged by fire to prevent it from being covered by vegetation re-growth and becoming a serious safety hazard.
- B. Location/(Suitable) Sites:** Burnt fencing will be removed at locations within interior portions of the San Diego National Wildlife Refuge. See Vegetation Treatment Map, Appendix IV for exact locations.
- C. Design/Construction Specifications:**
18. All fence materials will be removed from the Refuge and disposed.
- D. Purpose of Treatment Specifications (relate to damage/change caused by fire):** The treatment is required to protect the public and staff from being injured by damaged fence, a public health and safety issue.
- E. Treatment consistent with Agency Land Management Plan (identify which plan):** The treatment is consistent with the Refuge purpose of providing for public enjoyment of the Refuge in a safe manner.
- F. Treatment Effectiveness Monitoring Proposed:** The treatment will be considered successful when the hazardous downed fence line is removed.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Contracting Officer: GS-11/5 @ \$41.60/hr. X 8 hrs./day X 3 days X 1 year	\$999
Project COR: GS-11/5 @ \$41.60/hr. X 8 hrs./day X 6 days X 1 year	\$1,997
TOTAL PERSONNEL SERVICE COST	\$2,996
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Removal of downed fence materials: \$2,000/mile X 2.5 miles X 1 year	\$5,000
TOTAL CONTRACT COST	\$5,000

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISH	PLANNED COST
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	DATE (M/D/YYYY)					MENTS	
FY 08	12/01/2007	09/30/2008	S	Miles	\$3,200	2.5	\$7,996
TOTAL							\$7,996

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	M, C
3. Estimate supported by cost guides from independent sources or other federal agencies	E
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Appendix I, Vegetation Resource Assessment; See Appendix IV, Vegetation Treatment Map.

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$3,200		2.5 miles	\$7,996
TOTAL COST					\$7,996

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Replace Boundary Fence	PART E FWS Spec-#	#11 FWS Replace Boundary Fence
NFPORS TREATMENT CATEGORY*	Facility & Infrastructure	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Fence Replacement	WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	Coastal California gnatcatcher, Otay tarplant, and Quino checkerspot butterfly

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

- A. General Description:** Reconstruct approximately 11.7 miles of protective fences on San Diego National Wildlife Refuge burned by the Harris Fire. Remove burned fence materials, including wire. Fences will be used to protect designated Critical Habitat for the California gnatcatcher, Otay tarplant, and Quino checkerspot butterfly from OHV traffic and to allow for natural recovery of vegetation.
- B. Location/(Suitable) Sites:** Fences are to be established on original fence line locations. See Vegetation Treatment Map, Appendix IV for exact locations.
- C. Design/Construction Specifications:**
19. New fence materials shall be utilized
 20. Construct 4-wire fence for San Diego National Wildlife Refuge boundary consisting of 3 strands of 12 ½ gauge twisted barbed wire and a bottom strand of 12 ½ gauge twisted smooth wire. Steel 6 foot T-posts shall be driven 1 ½ feet in the ground and spaced at 16 ½ feet apart.
 21. Steel posts (stress panels) as recommended shall be placed at all corners or at a maximum of ¼ mile spacing or as necessary to compensate for topographical undulations. Posts are to be secured using 12 ½ gauge smooth twisted steel wire with a minimum breaking strength of 950 pounds of force.
 22. Additional specifications regarding fence replacement will be provided at time of reconstruction initiation.
 23. Remove all burned fence materials from the area, including wire, staples, and nails.
 24. Install pre-fabricated gates at exterior boundary access locations.
- D. Purpose of Treatment Specifications (relate to damage/change caused by fire):** Protective fences may be constructed using emergency stabilization funds to protect burned areas (from impacts from wildlife, domestic wildlife, or humans and for health and safety of agency personnel and the public) during the recovery period for burned vegetation or the establishment period for new seedlings.
- E. Treatment consistent with Agency Land Management Plan (identify which plan):** The boundary fence is required to maintain the refuges closure to the public and provide for natural recovery and protection of the Federal Endangered/Threatened California gnatcatcher, Quino checkerspot butterfly, and Otay tarplant.
- F. Treatment Effectiveness Monitoring Proposed:** The treatment will be considered successful if OHV's are excluded from the burned areas during the prescribed recovery period.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Contracting Officer: GS-11/5 @ \$41.60/hr. X 8 hrs./day X 3 days X 1 year	\$999
Project COR: GS-11/5 @ \$41.60/hr. X 8 hrs./day X 6 days X 1 year	\$1,997
Project Inspector: GS-11/5 @ \$41.60/hr. X 8 hrs./day X 14 days X 1 year	\$4,660
TOTAL PERSONNEL SERVICE COST	\$7,656
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
Vehicle for Project COR @ \$200/week X 2 weeks X 1 year	\$400
Vehicle for Project Inspector @ \$200/week X 3 weeks X 1 year	\$600
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$1,000
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
12 ½ gauge galvanized twisted two-point barbed wire: \$65.63/roll X 12 rolls/mile X 11.7 miles X 1 year	\$9,215

12 ½ gauge galvanized twisted smooth wire: \$54.00/roll X 4 rolls/mile X 11.7 miles X 1 year	\$2,528
6 foot steel painted T-posts: \$3.71/post X 320 posts/mile X 11.7 miles X 1 year	\$13,891
36 " wire fence stays: \$21.90/bundle X 6.4 bundles/mile X 11.7 miles X 1 year	\$1,640
Wire fence clips (50/pk): \$1.69/pk X 26 pks/mile x 11.7 miles X 1 year	\$515
Pre-fabricated Gate: 5 gates @ \$900/gate X 1 year	\$4,500
Steel Pipe (2 3/8" X 7"): \$14.78/pipe X 12 pipes/mile X 11.7 miles X 1 year	\$2,076
Steel Pipe (1 5/8" X 7"): \$9.10/pipe X 8 pipes/mile X 11.7 miles X 1 year	\$852
Galvanized brace bands (2 ¼" heavy): \$0.44/band X 14 bands/mile X 11.7 miles X 1 year	\$73
Carriage bolts and nuts (3/8 x 1 ½"): \$0.08/each X 14/mile X 11.7 miles X 1 year	\$14
TOTAL MATERIALS AND SUPPLY COST	\$35,304
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Fencing cost for installation: \$7,000/mile X 11.7 miles X 1 year	\$81,900
Fencing cost for removal of burned materials: \$2,000/mile X 11.7 miles X 1 year	\$23,400
TOTAL CONTRACT COST	\$105,300

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY 08	12/01/2007	09/30/2008	S	Miles	\$12,758	11.7	\$149,260
TOTAL							\$149,260

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	M, C
3. Estimate supported by cost guides from independent sources or other federal agencies	E
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Appendix I, Vegetation Resource Assessment; See Appendix IV, Vegetation Treatment Map.

TOTAL COST BY JURSDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$12,758		11.7 miles	\$149,260
TOTAL COST					\$149,260

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Replace damaged/destroyed boundary and area closure signs	PART E FWS Spec-#	12 Replace Boundary/Closure Signs
NFPORS TREATMENT CATEGORY*	Facility & Infrastructure	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Facility Closure	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	Gnatcatcher, Least Bell's Vireo, Quino Checkerspot Butterfly, SW Willow Flycatcher

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

A. General Description: Replace burnt refuge boundary and area closure signs to protect recovering habitat.

B. Location/(Suitable) Sites: San Diego National Wildlife Refuge

C. Design/Construction Specifications: The cost of replacing boundary and area closure signs is based on the Regions Real Property Inventory developed by the Regional Engineering Department.

D. Purpose of Treatment Specifications (relate to damage/change caused by fire): The signs are required to enforce area closures to allow for recovery of the area and to protect designated critical habitat.

E. Treatment consistent with Agency Land Management Plan (identify which plan): The signs are included in the refuges Real Property Inventory, Management Plan, and Fire Management Plan as essential mission critical facilities.

F. Treatment Effectiveness Monitoring Proposed: The treatment will be considered successful when the boundary signs are back in place to enforce area closures.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Project Inspector: GS-11 @ \$36.69/hr X 8 hrs/day X 2 days X 1 year	\$ 587
TOTAL PERSONNEL SERVICE COST	\$ 587
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
500 Boundary Signs X \$40 ea.	\$ 20,000
300 Area Closed Signs X \$40 ea.	\$ 12,000
300 U-Channel Metal Posts X \$ 4.50 ea.	\$ 1,350
TOTAL MATERIALS AND SUPPLY COST	\$ 33,350
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Contractor removes debris from and provides all materials and labor to construct new boundary signs	\$ 4,500
TOTAL CONTRACT COST	\$ 4,500

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
2008	12/1/07	03/1/08	C	Signs	\$48	800	\$ 38,437
TOTAL							\$ 38,437

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	M, C
3. Estimate supported by cost guides from independent sources or other federal agencies	E
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Public Safety and Facilities Assessment, Appendix I.

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$ 38,437			\$ 38,437
TOTAL COST		\$ 38,437			\$ 38,437

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Construct Asphalt Water Bar	PART E FWS Spec-#	13 FWS Construct Asphalt Water Bar
NFPORS TREATMENT CATEGORY*	Roads	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Structure	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	N

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

- A. General Description:** Water bars placed cross slope on a paved out-sloped single lane road used for access to F&WS property and multi-communication towers. Water bars are equivalent to 15 mph speed bumps extending to cut slope of the road and extending to the edge of the outside road slope. A 4 foot water bar (Spur) is installed 8 feet uphill of main water bar to reduce concentrated flow from the cut bank side of the road. Asphalt pad (Outlet) installed as a stable outlet for concentrated flow, from the water bar, across the earth road shoulder. Water bars on the asphalt roadway shall be painted white for safety. .
- B. Location/(Suitable) Sites:** Five sites on Millar Ranch Road, the nearest cross street is Campo Road, south of Jamacha Junction. See maps and GPS reference coordinates.
- C. Design/Construction Specifications:**
25. Single asphalt bump is to be constructed parabolic in shape, covering 3 feet of street (width) with a height between 3 ¼ and 3 ¾ inches.
 26. Length to extend from cut bank to 6 inches past the top edge of fill slope set at an approximate 30 degree angle downhill from a line perpendicular to the road.
 27. Spur shall be constructed similar to asphalt bump on cut slope shoulder extending into the roadway a minimum of 3 inches.
 28. Outlet is to be constructed of asphalt to transition smoothly from the road to a minimum 6 inches down the fill slope and continuous to the asphalt bump. Width to be a minimum of 3 feet wide where it is attached to the road.
 29. New water bars, outlets and spurs are to be constructed to look similar to existing water bars. See example photo.
 30. Asphalt bump between existing fog lines to be painted white for visibility.
- D. Purpose of Treatment Specifications (relate to damage/change caused by fire):** Ash flows and sediment from the fire will create hazardous (slick) road conditions due to the steepness and out sloping of the road. Water bars will stop storm water flows in the road side ditches from accumulating water and depositing debris and ash over large areas of the roadway.
- E. Treatment consistent with Agency Land Management Plan (identify which plan):** Environmental Assessment and Land Protection Plan for Otay-Sweetwater Unit of San Diego National Wildlife Refuge, San Diego County, California; SDNWR Fire Management Plan.
- F. Treatment Effectiveness Monitoring Proposed:** Inspect waters bars and repair soil erosion after major storm events.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
TOTAL PERSONNEL SERVICE COST	
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
Asphalt Water Bar, Spur, and Outlet @ \$600 x 5 each x 1 FY (installed)	\$3,000

TOTAL MATERIALS AND SUPPLY COST	\$3,000
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
Mob and De-mob @\$1,000 x 1 once x 1 FY	\$1000
TOTAL TRAVEL COST	\$1,000
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
TOTAL CONTRACT COST	

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY 2008	12/2007	02/2008	S	each	\$600	5	\$3,000
FY 2008	12/2007	02/2008	S	each	\$1000	1	\$1,000
TOTAL							\$4,000

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	E, M, T, C
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Watershed Assessment, Appendix I. See Watershed Treatment Map, Appendix IV

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$4,000		5	\$4,000
TOTAL COST		\$4,000		5	\$4,000



Example of typical asphalt bar, spur and outlet.

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Install Drain Outlets	PART E FWS Spec-#	14 FWS Place Road Drain Outlets
NFPORS TREATMENT CATEGORY*	Roads	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Culverts	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	NA

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

- A. General Description:** Drain outlets are placed in locations in places where sheet flow from the road is concentrated on the embankments (fill slopes) that need protection. Drain outlets are constructed from a sheet metal headwall with a 24 inch sheet metal transition attached to an 18 inch CMP cut in half longwise. See page 118, Figure 70 of BAER Treatments Catalog (Dec. 2006)
- B. Location/(Suitable) Sites:** Three sites on Millar Ranch Road, the nearest cross street is Campo Road, south of Jamacha Junction. See Values-at-Risk table, treatment maps and GPS reference coordinates.
- C. Design/Construction Specifications:**
- Headwall dimensions to be 24 inches tall and 66 inches wide with a 3 inch 90 degree flange (opposite side from CMP).
 - Invert of transition to be centered and 18 inches from the top edge of the headwall.
 - Earth to be well compacted against headwall when installed. Compacted asphalt shall smoothly transition from the roadway to invert in the headwall.
 - Outlet of the CMP should discharge in a 3 ft square area of hand placed 6 inch average diameter rocks to dissipate flows.
 - CMP to be 10 ft long and field cut to fit the length of the embankment slope. CMP shall be continuously supported on the embankment slope
- D. Purpose of Treatment Specifications (relate to damage/change caused by fire):** The drain outlets will prevent erosion on fill slopes of the road. The burned area will contribute additional water laden with ash and sediment. Water bars concentrate the flow which increases the risk of erosion on the embankment slope.
- E. Treatment consistent with Agency Land Management Plan (identify which plan):** Environmental Assessment and Land Protection Plan for Otay-Sweetwater Unit of San Diego National Wildlife Refuge, San Diego County, California.
- F. Treatment Effectiveness Monitoring Proposed:** Inspect drain outlets and repair soil erosion after major storm events.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
F&WS engineering review and contract administration (18%)	\$694
TOTAL PERSONNEL SERVICE COST	\$694
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
Drain outlet @ \$600 / Drain outlet X 3 Num of Drain outlets	\$1,800
TOTAL MATERIALS AND SUPPLY COST	\$1,800
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
Mob and De-mob @\$1,000 x 1 once x 1 FY	\$400
TOTAL TRAVEL COST	\$400
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Contract Labor Installation @ \$260 / Drain outlet X 3 Num of Drain outlets	\$780
Contract rock placement @ \$60 / Drain outlet X 3 Num of Drain outlets	\$180
TOTAL CONTRACT COST	\$960

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY 2008	12/2007	02/2008	S	each	\$1151	3	\$3,454
FY 2008	12/2007	02/2008	S	each	\$400	1	\$400
TOTAL							\$3,840

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	M, T, C
3. Estimate supported by cost guides from independent sources or other federal agencies	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Watershed Assessment, Appendix I. See Watershed Treatment Map, Appendix IV

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$3,840		3	\$3,840
TOTAL COST		\$3,840		3	\$3,840



Metal Overside Drain. Page 118, Figure 70 of BAER Treatments Catalog (Dec. 2006)

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Flood Hazard Signs	PART E FWS Spec-#	15 FWS Flood Hazard Signs
NFPORS TREATMENT CATEGORY*	Protection and Warning	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Warning Signs	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	N

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

- A. General Description:** Flood and mudflow hazard warning signs should be developed for immediate installation at low water crossings for the protection of life and property. These signs are necessary to inform the public of immediate danger posed by flash floods and mudflow events generated by storms.
- B. Location/(Suitable) Sites:** One site on Millar Ranch Road at the low water crossing 0.25 miles west of Campo Road, and 2 miles south of Jamacha Junction. See Value at Risk Table, maps and GPS reference coordinates in the watershed assessment section.
- C. Design/Construction Specifications:**
36. Sign locations on county roads to be approved by San Diego County Transportation Department. (to be confirmed prior to ordering)
 37. All signs will be constructed of minimum 0.080 inch aluminum or equivalent gage, galvanized sheet metal with black lettering on a reflectorized yellow background with wording that states: FLASH FLOOD AREA (see example)
 38. Flash flood warning signs will be 36-inches (wide) X 36-inches (tall) rectangular signs and will be mounted with 2 carriage bolts per sign on one steel U channel post. Post is to be installed in firm earth approximately 36 inches deep.
 39. Two signs per low water crossing facing on-coming traffic. Signs to be placed approximately 100 ft before entering the low water crossing. Signs shall be well visible to traffic and free of visual obstructions (other signs, vegetation, etc.)
- D. Purpose of Treatment Specifications (relate to damage/change caused by fire):** To provide warning to residents and the general public about potential floods and mud and debris flows at low water crossings.
- E. Treatment consistent with Agency Land Management Plan (identify which plan):**
- F. Treatment Effectiveness Monitoring Proposed:** Inspect signs annually and replace as necessary.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
F&WS engineering review and contract administration (18%)	\$82
TOTAL PERSONNEL SERVICE COST	\$82
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
Ten-foot steel U channel posts w/ 1 per sign @ \$18.00/post x 2 Num of Signs =	\$36
Two 3/8 inch carriage bolts/nuts/washer assemblies per sign @ \$3.00 each x 2 Num of Signs =	\$6
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$42
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Contract Labor Installation @ \$60 / sign X 2 Num of Signs	\$120
Contract Sign Production @ \$85 / sign X 2 Num of Signs	\$170
TOTAL CONTRACT COST	\$290

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISH	PLANNED COST
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	DATE (M/D/YYYY)					MENTS	
2008	01/02/2008	01/31/2008	S	signs	\$207	2	\$414
TOTAL							\$414

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	M
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies	C
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Watershed Assessment, Appendix I. See Watershed Treatment Map, Appendix IV

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$414		2	\$414
TOTAL COST		\$414		2	\$414



Example of 36" x 36" reflective sign

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Spillway Repair	PART E FWS Spec-#	16 FWS Spillway Repair
NFPORS TREATMENT CATEGORY*	Erosion / Sedimentation	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Repair Control Structure	WUI? Y / N	Y
IMPACTED COMMUNITIES AT RISK		IMPACTED T&E SPECIES	N

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

- A. General Description:** Spillway has eroded from past storm events and the headcut is nearing spillway crest of the reservoir.
- B. Location/(Suitable) Sites:** Mother Miguel Pond spillway at San Diego NWR. Located approx. 600 ft north of the SDG&E substation off the intersection of San Miguel road and San Miguel Ave. Site is 2.7 miles northeast from the town of Bonita.
- C. Design/Construction Specifications:**
40. Reshape spillway (250 ft) with earth from surrounding native materials (primarily on north side of channel) to form u-shaped channel approximately 4.5 feet deep in the center and 14 feet top width. Compact soil in maximum 4 inch lifts.
 41. Place geotextile in contact with earthfill. Overlap seams 1 foot minimum. Use two 10 ft wide rolls or three 8 ft wide rolls, or four 6 ft wide rolls running parallel with centerline of spillway channel.
 42. Place well graded angular rock (12 inches and less) on geotextile to a depth of 18 inches at the centerline of the channel and tapering to 12 inches thick at top edge of channel. Finished dimensions of the channel should be approximately 3 ft deep at the centerline with a top width of approximately 12 feet. Channel slope should be constant with 6 ft flat extension apron on downstream end of the spillway to provide a stable outlet. Rock for apron can be placed around existing willows in the downstream end of the spillway channel.
 43. Scarify and lightly mulch bare and disturbed soil above rock in spillway and reseed to desirable forb plant community. Planting soil can be place over rock fill and washed into rock voids to encourage forb growth.
- D. Purpose of Treatment Specifications (relate to damage/change caused by fire):** Increased runoff from burned area will accelerate erosion in the spillway and increase the risk of losing storage capacity in the reservoir.
- E. Treatment consistent with Agency Land Management Plan (identify which plan):** Environmental Assessment and Land Protection Plan for Otay-Sweetwater Unit of San Diego National Wildlife Refuge, San Diego County, California.
- F. Treatment Effectiveness Monitoring Proposed:** Inspect annually and after major storm events. Repair damage to spillway as needed.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).		COST / ITEM
F&WS engineering review and contract administration (18%)		\$2846
Project Inspector: GS-11@ \$36.69/hr x 8 hrs/year x 3 FY		\$880
TOTAL PERSONNEL SERVICE COST		\$3726
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.		
Earthwork (shaping, placement, and compaction) @464 Cubic Yards(CY) x \$5/CY		\$2320
Rock (materials and placement of 12 inch maximum that is well graded and angular) @195 CY x \$25/CY		\$6825
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST		\$9145
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):		
Geotextile @5000 sf x \$0.12/sf		\$600
Seed @11250 sf x \$0.025/sf		\$281
Mulch @30 cy x \$15/CY		\$450
Planting soil @24 cy x \$40/CY		\$960
TOTAL MATERIALS AND SUPPLY COST		\$2291
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):		
TOTAL TRAVEL COST		

CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Lump sum placement of Geotextile	\$200
Lump sum placement of Seed	\$50
Lump sum placement of Mulch	\$200
Lump sum placement of Planting soil	\$200
TOTAL CONTRACT COST	\$650

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
2008	06/01/2008	08/01/2008	S	Job	\$15,812	1	\$15,812
TOTAL							\$15,812

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	M
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies	E, C
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Watershed Assessment, Appendix I. See Watershed Treatment Map, Appendix IV

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$15,812		1	\$15,812
TOTAL COST		\$15,812		1	\$15,812

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Road Re-Contouring	PART E FWS Spec-#	17 FWS Road Re-Contouring
NFPORS TREATMENT CATEGORY*	Roads	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Prism/Seeding	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	San Diego NWR	IMPACTED T&E SPECIES	N/A

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

- A. General Description:** A 600 ft trail from vehicle traffic following the ridgeline has eroded down the tire tracks from concentrated flows. If not repaired, this gully will contribute a disproportionate share of sediment to the roadway during storm events after the fire.
- B. Location/(Suitable) Sites:** One site off Millar Ranch Road, the nearest cross street is Campo Road, south of Jamacha Junction. See maps and GPS reference coordinates.
- C. Design/Construction Specifications:**
44. Blade trail on the contour and smooth to prevent concentrated flows.
 45. Install low water bars to prevent water from traveling down the ridge line.
 46. Limit disturbed area to approximately 25 ft from the center line of the existing gully. Maximum area of disturbance should not exceed 50 ft by 600 ft. Do not enter areas with equipment flagged to be left undisturbed.
 47. Leave soil surface sufficiently roughened for broadcast seeding.
- D. Purpose of Treatment Specifications (relate to damage/change caused by fire):** Gully will contribute a disproportionate share of sediment to the roadway during storm events after the fire.
- E. Treatment consistent with Agency Land Management Plan (identify which plan):** Environmental Assessment and Land Protection Plan for Otay-Sweetwater Unit of San Diego National Wildlife Refuge, San Diego County, California; SDNWR Fire Management Plan.
- F. Treatment Effectiveness Monitoring Proposed:** Inspect seeding and check for erosion on a annual basis.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
F&WS engineering review and contract administration (18%)	\$260
Project Inspector: GS-11@ \$36.69/hr x 2 hrs/year x 3 FY	\$240
TOTAL PERSONNEL SERVICE COST	\$500
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
Earthwork (shaping, seedbed prep and placement of water bars) @125/hr x \$4 hrs	\$500
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	\$500
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
Seed @30,000 sf x \$0.010/sf	\$300
TOTAL MATERIALS AND SUPPLY COST	\$300
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Lump sum placement of Seed	\$150
TOTAL CONTRACT COST	\$150

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISH	PLANNED COST
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	DATE (M/D/YYYY)					MENTS	
FY 08	12/01/2007	11/01/2008	S	Job	\$1,450	1	\$1,450
TOTAL							\$1,450

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies	E, M, C
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Watershed Assessment, Appendix I. See Watershed Treatment Map, Appendix IV

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$1,450		1	\$1,450
TOTAL COST		\$1,450		1	\$1,450

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Road Maintenance/Debris Removal	PART E FWS Spec-#	18 FWS Road Debris Removal
NFPORS TREATMENT CATEGORY*	Roads	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Hazard/Debris Removal	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	NA

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

- A. General Description:** During major storm events low water crossings, culverts, and other sections of roadways can be expected to flood or experience significant surface erosion as a result of the effects to watershed conditions from the fires. Flood events will erode and/or deposit sediment, organic debris, and boulders on roadways and making them impassable and unsafe. This specification provides for maintenance and removal of sediment and debris from USFWS Refuge roadways.
- B. Location/(Suitable) Sites:** See Watershed Treatment Map, Appendix IV.
- C. Design/Construction Specifications:**
48. Use front end load and/or tracked excavator with dump truck to clear sediment and debris removal from roadways after major storm events.
 49. Deposit removed material out of the floodplain on to higher ground to prevent any transport of material back into channels which could eventually move back onto roadways.
- D. Purpose of Treatment Specifications (relate to damage/change caused by fire):** Increased runoff and sediment debris delivery to refuge transportation infrastructure.
- E. Treatment consistent with Agency Land Management Plan (identify which plan):** Environmental Assessment and Land Protection Plan for Otay-Sweetwater Unit of San Diego National Wildlife Refuge, San Diego County, California.
- F. Treatment Effectiveness Monitoring Proposed:** Inspect roadways after major storm events to determine if additional treatment is required.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
WG-10 or equivalent, Equipment Operators: 2 @ \$33.50/hour x 10 hours x 4 flood events =	\$2,680
Backhoe @ \$85/hour x 10 hours x 4 flood events =	\$3,400
Dump truck @ \$65/hour x 10 hours x 4 flood events =	\$2,600
Move in/out @ \$150/hour x 4 hours x 4 flood events =	\$2,400
TOTAL PERSONNEL SERVICE COST	\$11,080
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
TOTAL CONTRACT COST	

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
2008	12/1/2007	9/30/2008	F	Job	\$2,667	4	\$11,080
TOTAL							\$11,080

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies	
4. Estimates based upon government wage rates and material cost.	P, E
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Watershed Assessment, Appendix I. See Watershed Treatment Map, Appendix IV

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$11,080		4	\$11,080
TOTAL COST		\$11,080		4	\$11,080

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Replace Remote Automated Weather Station	PART E FWS Spec-#	19 Replace RAWS
NFPORS TREATMENT CATEGORY*	Facility & Infrastructure	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Replace Administrative Facility	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	NA

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>A. General Description: Replace damaged Remote Automated Weather Station (RAWS) required for management of daily weather readings essential to firefighter safety.</p> <p>B. Location/(Suitable) Sites: San Diego National Wildlife Refuge</p> <p>C. Design/Construction Specifications: Replace RAWS by contract in accordance with the Regions Real Property Inventory developed by the Regional Engineering Department.</p> <p>D. Purpose of Treatment Specifications (relate to damage/change caused by fire): The RAWS is vital to obtaining daily fire weather essential to firefighter safety.</p> <p>E. Treatment consistent with Agency Land Management Plan (identify which plan): The RAWS is included in the refuges Real Property Inventory, Management Plan, and Fire Management Plan as essential mission critical facilities.</p> <p>F. Treatment Effectiveness Monitoring Proposed: The treatment will be considered successful when the RAWS is repaired and available for management of the refuge.</p>

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Project Inspector: GS-11 @ \$36.69/hr X 8 hrs/day X 2 days X 1 year	\$ 1,174
Contracting Officer GS-11 @ \$36.69/hr X 8 hrs/days X 2 days X 1 year	\$ 1,174
TOTAL PERSONNEL SERVICE COST	\$2,348
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Repair Remote Automated Weather Station by Contractor	\$ 9,800
TOTAL CONTRACT COST	\$ 9,800

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
2008	12/1/07	03/1/08	C	RAWS	\$12,148	1	\$12,148
TOTAL							\$12,148

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	M,C
3. Estimate supported by cost guides from independent sources or other federal agencies	E
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Public Safety and Facilities Assessment, Appendix I.

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$12,148		1	\$12,148
TOTAL COST		\$12,148			\$12,148

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Replace Firefighter Water Supply Systems	PART E FWS Spec-#	20 Replace Suppression Water Systems
NFPORS TREATMENT CATEGORY*	Facility and Infrastructure	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Replace Administrative Facility	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	NA

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>A. General Description: The water supply systems at the "Rice Barn" and the Mother Miguel Pond were damaged. This water tank, pump and plumbing system is required for firefighting on this part of the refuge.</p> <p>B. Location/(Suitable) Sites: San Diego National Wildlife Refuge</p> <p>C. Design/Construction Specifications: Replace water tank, and plumbing system by contract in accordance with the Regions Real Property Inventory developed by the Regional Engineering Department.</p> <p>D. Purpose of Treatment Specifications (relate to damage/change caused by fire): The water system is required to provide firefighting capability on the refuge.</p> <p>E. Treatment consistent with Agency Land Management Plan (identify which plan): The water system is maintained by the refuge fire program and is included in the refuges Real Property Inventory, Management Plan, and Fire Management Plan as essential mission critical facilities.</p> <p>F. Treatment Effectiveness Monitoring Proposed: The treatment will be considered successful when the water system is repaired and available for firefighting.</p>
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LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Project Inspector: GS-11 @ \$36.69/hr X 8 hrs/day X 2 days X 1 year	\$ 1,174
Contracting Officer GS-11 @ \$36.69/hr X 8 hrs/days X 2 days X 1 year	\$ 1,174
TOTAL PERSONNEL SERVICE COST	\$2,349
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Replace 20,000 tank	\$26,000
Replace pump and water supply line	\$14,400
Replace Mother Miguel Water supply line	\$12,450
TOTAL CONTRACT COST	\$52,850

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
2008	12/01/2007	03/01/2008	C	Water System	\$27,599	2	\$55,198
TOTAL							\$55,198

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	M,C
3. Estimate supported by cost guides from independent sources or other federal agencies	E
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Public Safety and Facilities Assessment, Appendix I.

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$55,198		2	\$55,198
TOTAL COST		\$55,198			\$55,198

PART F - INDIVIDUAL TREATMENT SPECIFICATION

TREATMENT/ACTIVITY NAME	Replace Radio Repeater	PART E FWS Spec-#	21 Replace Repeater
NFPORS TREATMENT CATEGORY*	Facility & Infrastructure	FISCAL YEAR(S) (list each year):	2008
NFPORS TREATMENT TYPE *	Replace Administrative Facility	WUI? Y / N	N
IMPACTED COMMUNITIES AT RISK	San Diego National Wildlife Refuge	IMPACTED T&E SPECIES	NA

* See NFPORS Restoration & Rehabilitation module - Edit Treatment screen for applicable entries.

WORK TO BE DONE (describe or attach exact specifications of work to be done):

<p>A. General Description: Replace damaged Radio Repeater required for management of emergency communications on the refuge</p> <p>B. Location/(Suitable) Sites: San Diego National Wildlife Refuge</p> <p>C. Design/Construction Specifications: Replace Radio Repeater by contract in accordance with the Regions Real Property Inventory developed by the Regional Engineering Department.</p> <p>D. Purpose of Treatment Specifications (relate to damage/change caused by fire): The Repeater is required to manage routine and emergency radio communication on the refuge.</p> <p>E. Treatment consistent with Agency Land Management Plan (identify which plan): The radio repeater is included in the refuges Real Property Inventory, Management Plan, and Fire Management Plan as essential mission critical facilities.</p> <p>F. Treatment Effectiveness Monitoring Proposed: The treatment will be considered successful when the repeater station is repaired and available for management of the refuge.</p>
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LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST / ITEM
Project Inspector: GS-11 @ \$36.69/hr X 8 hrs/day X 2 days X 1 year	\$ 1,174
Contracting Officer GS-11 @ \$36.69/hr X 8 hrs/days X 2 days X 1 year	\$ 1,174
TOTAL PERSONNEL SERVICE COST	\$ 2,348
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	
TOTAL MATERIALS AND SUPPLY COST	
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	
TOTAL TRAVEL COST	
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	
Replace radio repeater	\$ 25,245
TOTAL CONTRACT COST	\$ 25,245

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
2008	12/01/2007	02/01/2008	C	Repeater	\$27,593	1	\$27,593
TOTAL							\$27,593

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	M,C
3. Estimate supported by cost guides from independent sources or other federal agencies	E
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

See Public Safety and Facilities Assessment, Appendix I.

TOTAL COST BY JURISDICTION

JURISDICTION	Poomacha	Harris	Witch	UNITS TREATED	COST
FWS		\$27,593		1 Repeater	\$27,593
TOTAL COST		\$27,593			\$27,593

BURNED AREA EMERGENCY STABILIZATION PLAN

2007 SOCAL FIRES

APPENDIX I RESOURCE ASSESSMENTS

- **WATERSHED & SOILS RESOURCE ASSESSMENT**
- **VEGETATION ASSESSMENT**
- **CULTURAL RESOURCE ASSESSMENT**
- **WILDLIFE ASSESSMENT**
- **PUBLIC SAFETY AND FACILITIES ASSESSMENT**

BURNED AREA EMERGENCY STABILIZATION PLAN

2007 Southern California Fires

PUBLIC SAFETY AND FACILITIES ASSESSMENT

I. OBJECTIVES

- Assess and mitigate fire damage to facilities necessary for public safety.
- Assess and mitigate public safety concerns created or exacerbated by fire impacts..
- Initiate implementation of short-term emergency stabilization treatments prescribed by the BAER team and develop an organization and process to ensure completion of treatments.
- Communicate with Incident Management Teams (IMT), state & county officials, tribal leaders, federal agencies and private landowners to insure acceptable stabilization and repair techniques are implemented.

II. ISSUES

- Public safety hazards resulting from or exacerbated by fire-related impacts.
- Fire damage to safety signs, safety guard rails, boundary fences, and other critical public safety infrastructure damaged by the fire on tribal, BLM and FWS lands.
- Timely completion of emergency stabilization treatments determined necessary to protect life, property, and critical cultural and natural resources.

III. OBSERVATIONS

A. Background –

The Harris and Witch fires started on October 21, 2007; two days later, on October 23, 2007, the Poomacha fire started. All three fires were driven by extreme "Santa Ana" wind events, and burned rapidly through coastal scrub, riparian forest, and rangeland fuels. The fires burned through extensive wildland urban interface areas, damaging or destroying homes, utility and road infrastructure, and various other developments. The roughly 90,000 acre Harris fire burned 211 homes and 262 outbuildings. The Witch fire burned over 163,000 acres, 1,125 homes, and 499 outbuildings. The Poomacha fire burned nearly 50,000 acres and 138 homes, 1 commercial building, and 78 outbuildings.

The BAER Deputy Team Leaders coordinated with the Incident Management Teams assigned to the fires to ensure safe and seamless team interaction; secure maps, data and other fire intelligence; and provide aviation support for aerial reconnaissance and logistical support for the BAER operation. Daily briefings were conducted with BAER team members addressing fire behavior, suppression operations and restrictions, and other relevant safety conditions.

B. Reconnaissance Methodology and Results –

Potential areas of concern were identified through discussions with the respective Incident Management Teams, resource advisors, tribal and agency officials, and local residents. Focused ground and aerial reconnaissance was then conducted on tribal, BLM and FWS lands within the fire areas by BAER team members and agency representatives. Potential hazards and infrastructure needs were identified, mapped, photographed and recorded. These include:

- Damaged or destroyed traffic signs.
- Destroyed area closure and boundary signs.
- Damaged highway guard rails.
- Damage to a FWS radio repeater and remote automated weather station.
- Damage to BIA power transmission poles.
- Abandoned mine and well sites on BLM lands.

The damaged BIA power line was assessed by Tom Dang, BIA Regional Engineer in consultation with Tribal Public Works. Sites on BLM and FWS lands were assessed by respective agency resource advisors. These data and accompanying specifications were provided to the BAER Team for incorporation in this plan.

Tree hazards were identified and designated by BAER foresters. They are addressed in the Vegetation Assessment included in this plan. Flood and debris flow hazards were identified by the Watershed Group and are detailed in the Watershed Assessment.

C. Findings

Roadside Guard Rails – Damaged or destroyed traffic and directional signs were identified in the Red Gate Road neighborhood of the La Jolla Reservation, (Poomacha Fire), and on the San Miguel Mountain Road, San Diego National Wildlife Refuge (Harris Fire). Guard rails should be repaired as soon as practicable to ensure safety of residents, visitors, and workers.

Safety and Directional Signs - Damaged or destroyed traffic safety signs were identified in the Red Gate Road neighborhood of the La Jolla Reservation, (Poomacha Fire), and on the San Miguel Mountain Road, San Diego National Wildlife Refuge (Harris Fire).. These consist of speed limit and cautionary signs and are considered essential to safe use of these roads.

Boundary and Area Closure Signs –The Harris Fire destroyed boundary and area closure signs on BLM and FWS lands. These signs are considered necessary to protect critical habitat for the threatened and endangered Quino checkerspot butterfly, coastal California gnatcatcher, Bell's least vireo, and the Southwest willow flycatcher. Without area closure enforcement, these habitat areas are vulnerable to damage from off-highway vehicle traffic. (Various other measures, including fencing and other physical barriers, to aid in controlling public access to these types of sites are addressed in detail in the Vegetation Assessment.)

Abandoned Mines and Wells – One abandoned mine shaft and three open wells on BLM lands within the Harris Fire were identified as safety hazards. Prior to the fire these sites hazards were obscured by vegetation. Now that they are exposed they will likely invite use from nearby public use roads. One of the wells has an existing grate that should be reattached, while the grates on the other two wells are missing altogether. The vertical mine shaft will require fabrication and installation of a bat-accessible grate over the opening.

Power Lines – The power system at the Rincon Reservation transmits power at 4,160 volts, and is used to provide power to the irrigation/domestic pumping stations which supply water to tribal residents. Transmission lines in this system were damaged by the Poomacha Fire and associated high winds. Further damage occurred when San Diego Gas and Electric removed a section of the line to protect Tribal residents from potentially exposure to down lines. The first power pole that was damaged is located approximately 15 ft from the domestic pumping station. Damage likely occurred due to tension reduction when the line snapped. The pole is an angle structure, and has been weakened and there are deep long cracks from top to bottom. This structure carries 3 transformers and 3 cutouts, which put even more stress on the pole. The

transformers have 5 taps on the low voltage side, but not all of the taps are in use. The transformers are rated 2400/4160Y – 240/480 volts. The second power pole that was damaged is located on the other side of West Tribal road (see attached map). The fire charred the lower part of the pole and weakened its structure. It also has deep cracks from top to bottom. This existing infrastructure was damaged during the Poomacha Fire event and its repair is critical to restore normal domestic water delivery to Tribal residents (the pump is currently operating from power provided by a mobile emergency generator).

Remote Automated Weather Station (RAWS) – A Fish and Wildlife Service remote automated weather station located on Mother Miguel Mountain was destroyed during the Harris Fire. This free standing system is used for weather prediction for the Refuge's Fire Management Program.

Refuge Radio Repeater – The building housing the refuge's radio repeater burned during the Harris Fire. The radio repeater and associated solar panel used to power the system were destroyed with the building. The radio repeater provides emergency communications for the entire refuge, as well as law enforcement and fire management.

Fire Suppression Water Supply Systems– Two water systems used by the Refuge's Fire Management Program for fire suppression were damaged or destroyed during the Harris Fire. The Rice Barn system located on Mount Miguel was completely engulfed by the fire and resulted in total loss of the system, including melted PVC water lines, destruction of the plastic lined 20,000 gallon water tank, and the pump. The PVC water line on the Mother Miguel Water System was melted during the fire and will need to be replaced for the system to be operable.

Tree Hazards – Numerous tree hazards were identified and mitigated by fire suppression crews during the course of fire holding and mop-up. Additional tree hazards were subsequently identified by BAER foresters and operations specialists and mitigated by BAER work crews. Details concerning the marking and removal of hazard trees within all three fires can be found under the Vegetation Assessment in this plan.

Flood Hazard – Areas of potential flooding, as identified by the Watershed Group, were also found at various locations on all three fires. Flood hazard signs will be placed at appropriate locations as described in the Watershed Assessment.

Early Warning System – Communities on the La Jolla, Pauma, Rincon and Pala Reservations are at increased risk of flooding due to fire severity and vegetation loss in the watersheds above the communities. Installation of automated stream gauges, rain gauges, radio-repeaters, weather stations, warning sirens and base stations to provide downstream warnings to these communities will alleviate some of the risks to life and property in these communities. Additional details concerning the early warning system can be found in the Watershed Assessment.

IV. RECOMMENDATIONS

A. Specification Related

BIA Specifications:

Road Guard Rail Repair - Replace approximately 1,000 feet and repair approximately 1,100 feet of guard rails on Red Gate Road on the La Jolla Reservation. Steel posts will be used to replace burned wood posts.

Traffic Signs - Replace fire damaged road traffic signs to alleviate public safety hazards within the Red Gate neighborhood on the La Jolla Reservation.

Power Poles/Line Replacement - Replace power poles, cross arms, transformers, line and other material as necessary to restore power to the main water supply pump.

BLM Specifications:

Mine and Well Safety – Mitigate hazards associated with an abandoned mine shaft and three historic stone-lined domestic water wells on BLM lands impacted by the Harris Fire. Install bat-accessible metal grates, repair existing metal grates or fill with sand or other acceptable material to prevent public access.

Habitat Closure Signs - Purchase and install boundary markers, various control signs ("No Vehicle," or "No OHV"), and area closure signs to protect critical habitat for the Quino checkerspot butterfly on the Harris Fire.

FWS Specifications:

Road Guard Rails – Replace 915 feet of damaged or destroyed guard rails on the Mount Miguel Road.

Road Safety Signs – Replace damaged or destroyed road safety signs on the Mount Miguel Road. These signs and guard rail are necessary for the safety of vehicles traversing the narrow road on Mount Miguel.

Replace Radio Repeater – Replace the damaged radio repeater on Mount Miguel.

Replace Remote Automated Weather Station – Replace the damaged remote automated weather station on Mother Miguel Mountain.

Replace Water Supply Systems – The fire suppression water supply systems at the "Rice Barn" and Mother Miguel Pond were damaged.

Replace or Install Boundary/Closure Signs – Purchase and install boundary signs, and "Area Closed" signs at various locations on the refuge. These signs are essential for the protection of critical habitat for Quino checkerspot butterfly, Coastal California gnatcatcher, Bell's Least Vireo, and the Southwest willow flycatcher. Posting of these signs will prevent off-highway-vehicles from entering recovering critical habitat.

B. Management Recommendation - Rehabilitation (Non-Specification)

None

C. Management Recommendations – Non-Specification Related

Provide for safety of personnel assigned to implementation of the Emergency Stabilization Plan.

Identify and repair any additional impacts to public safety and facilities, documented and funded through the supplemental funding request process.

V. CONSULTATIONS

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VI. REFERENCES

Incident Narratives, Harris, Witch and Poomacha Fires, available in supporting documentation.

John Perez, Biologist, NPS-New River Gorge National River (304) 465-6537
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BURNED AREA EMERGENCY STABILIZATION PLAN

2007 SOUTHERN CALIFORNIA FIRES

SOIL AND WATERSHED RESOURCE ASSESSMENT

I. OBJECTIVES

- Assess overall soil and watershed changes caused by the fire, particularly those that pose substantial threats to human life and property, and critical natural and cultural resources. This includes evaluating changes to soil conditions, hydrologic function, and watershed response to precipitation events,
- Develop a map of soil burn severity, runoff potential, and debris flow potential
- Identify potential flood and erosion source areas and sediment deposition areas,
- Identify potential threats to life, property, and critical natural and cultural resources in relation to flooding, debris flows, erosion, and sediment deposition,
- Develop treatment recommendations, if necessary, and
- Identify future monitoring needs, if necessary.

II. ISSUES

- Risk to human life and property from floods, mudflows and debris flows within and downstream of the Poomacha, Witch and Harris fires
- Risk to municipal water supplies from flooding, sedimentation, and water quality degradation

III. OBSERVATIONS

A. Background

1. Physiography/Geology

The three Southern California Fires assessed in this report burned approximately 303,019 acres with over 1,000 homes destroyed. Low humidity coupled with Santa Ana (refer to Section 3 – Climate) winds in excess of 90 mph fueled flames for several days over varied terrain. Several years of drought caused low fuel moistures that contributed to extreme fire conditions. The fires assessed in this report are the Witch (163,111 acres), the Harris (90,345 acres), and the Poomacha (49,563 acres). The Poomacha and Witch Fires reburned 54,919 acres of the 2003 Paradise Fire area and 40,614 acres of the 2003 Cedar Fire. The Harris fire reburned 25,778 acres of the 2003 Otay fire area. All three fires occurred in San Diego County.

Land ownership is a complicated mosaic of federal, state, county, tribal, and private lands. Lands evaluated for this report were the Department of the Interior lands managed by the Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), and Fish and Wildlife Service (FWS). BIA lands include the following reservations: Barona, La Jolla, Mesa Grande, Pala, Pauma, and Rincon. Affected BLM lands are the San Diego County Border Mountains Planning Area and San Diego County Management Area. The San Diego National Wildlife Refuge comprised the FWS land was evaluated.

The areas burned are characterized by high relief and steep slopes with narrow canyon bottoms and outwash alluvial fans. The Palomar Range and foothills with associated southwest-draining canyons dominate the areas of Witch and Poomacha Fires. San Miguel Mountain and the Jamul Mountains border the western edge of the Harris Fire with canyons cross-cutting the landscape to the east. The elevations of the Witch Fire range from 40 feet above mean sea level (MSL) to 4,139 feet. The elevations of the Harris Fire range from 245 feet above MSL to 3,883 feet. The Poomacha Fire covered the area of greatest relief with elevations ranging from 823 feet above MSL to 5,655 feet near the summit of Palomar Mountain. Major drainages affected by the fires include the San Luis Rey River, San Dieguito River, Barona Creek, Cottonwood Creek, and Dulzura Creek, all of which drain generally to the west.

San Diego County can be divided into three distinct geomorphic regions: the Coastal Plain region exposed west of the Peninsular Ranges, the Peninsular Range region, and the Salton Trough region exposed east of the Peninsular Ranges (USDA, 1973). The geomorphic division reflects a basic geologic difference between the three regions, with Mesozoic metavolcanic, metasedimentary, and plutonic rocks predominating in the Peninsular Ranges, and primarily Cenozoic sedimentary rocks predominating to the west and east of the central mountain range. The plutonic rocks are predominantly granites ranging from quartz diorite to granodiorite. The decomposition of these materials produce coarse grained sand called decomposed granite. Weathering of these materials can be deep, creating potential for high rates of erosion, particularly in areas where vegetation has been removed by wildfires. Bedrock in these regions can be covered with Tertiary and Quaternary alluvium and colluvium deposits including marine and river terraces, fans, fluvial, and lacustrine structures. Structure is dominated by San Andreas style transpressional deformation creating a mosaic of right lateral strike-slip faulting and associated thrusting.

2. Soils

The NRCS soil survey divided San Diego County into four major physiographic provinces of Desert, Mountains, Foothills, and Coastal Plain. These provinces reflect differences in climate, soils, landform, and land use. Soils within the three fires in San Diego County (Harris, Poomacha, and Witch) have been mapped by the Natural Resource Conservation Service (NRCS) (USDA, 1973). The majority of the soils lie in the Foothills and Mountain provinces with a minor component in the Coastal Plain.

Brief descriptions of the dominant general soil associations that occur within the three fires follows:

- **Cieneba-Fallbrook Association, Very Rocky (23% of Harris Fire; 30% of Witch Fire; 53% of Poomacha Fire):** Excessively drained to well-drained coarse sandy loams and sandy loams that have a sandy clay loam subsoil over decomposed granodiorite; 9 to 75% slopes. This association occurs in the Foothills and is made up of soils that developed in material weathered in place from decomposed tonalite or granodiorite. Erosion hazard is high to very high.
- **Holland-Boomer Association, stony (20% of Poomacha fire; 10% of Witch Fire):** Well-drained stony fine sandy loams and stony loams that have a subsoil of sandy clay loam and stony clay loam over weathered micaceous schist and decomposed gabbro; 9-60% slopes. This association occurs in the Mountains and is made up of soils on steep to very steep slopes that developed in material weathered in place from mica schist and gabbro. Erosion hazard is moderate to high on unprotected slopes.
- **Crouch Association, Rocky (23% of Poomacha Fire):** Well-drained coarse sandy loams over weathered granodiorite; 30-75% slopes. These associations

occur in the Mountains and are made up of soils that developed in material weathered from granodiorite. Erosion hazard is high to very high.

- **Tollhouse-La Posta-Rock Land Association (11% of Poomacha Fire):** Excessively drained and some what excessively drained coarse sandy loams and loamy coarse sands over granitic rock, and areas of rock land; 9 to 65% slopes. This association occurs on uplands in the Mountains and is made up of soils that developed in material derived from decomposed granodiorite. Erosion hazard is high to very high.
- **Exchequer-San Miguel Association, Rocky (15% of Harris Fire):** Well-drained silt loams over metavolcanic rock; 30 to 75% slopes. This association is occurs in the Foothills and is made up of soils that developed in hard metavolcanic rock. Erosion hazard is moderate to high.
- **Rock Land Association (23% of Harris Fire):** Dominantly exposed bedrock and very large boulders. This association occurs in the Mountains and Foothills, and is 50 to 90% exposed bedrock and very large boulders.
- **Friant-Escondido association, eroded (21% of Harris Fire):** Well-drained fine sandy loam and very fine sandy loam over metasedimentary rock; 30-70% slopes. Erosion hazard is high to very high.

3. Climate

San Diego County has hot, dry summers and cool, wet winters. The Coastal Plains has the most equable climate of any of the physiographic provinces with only a light frost in the winter. The Foothills have more variation in temperature and more precipitation than the Coastal Plains. The Mountain area has a wider range of temperature and receives more precipitation than either the Coastal Plains or the Foothills. The Desert has the greatest variation in temperature and receives the least amount of precipitation.

The Coastal Plains has an average total precipitation of 13 inches and the Mountains average about 25 to 35 inches annually. The Foothills average between 14 and 24 inches annually. The amount of rainfall diminishes rapidly down the east slope of the Mountains and averages 5 inches in the Desert. The rainy season is commonly cited as October through April) although more than 85% of the region's rainfall occurs in the period between November through March. Humidity is fairly high on the Coastal Plains in summer because of the marine layer along the coast and relatively low in the Desert. Rainfall is highly variable and heaviest during the period of November to April. Rain is infrequent in summer, along with the occurrence of thunderstorms and tropical storms. Occasional amounts of hail occur, snowfall is rare and when recorded is trace amounts in the valleys, heavier in the mountains. Historically significant weather events are documented in southern California that includes heavy rain, snow events, severe thunderstorms, and strong winds (NOAA, 2007a).

Temperatures in all provinces are coolest in January and warmest in August with the exception of the Desert which experiences the warmest temperatures in July. The Coastal Plains have a mean high temperature of 71.2° F and a mean low of 63.2° F. The Foothills have a mean high temperature of 75.1° F and a mean low of 48.9° F. The Mountains have a mean high of 68.1° F and a mean low of 45.0° F. The Desert has a mean high of 84.1° F and a mean low of 52.5° F. Hot, dry winds named after the Santa Ana Canyon commonly occur between October and February. The Santa Ana winds are due to the pressure gradient between high pressure in the plateaus of the Great Basin and lower pressure over the Pacific Ocean (NOAA, 2007b).

The 90-day outlook for the southwest region predicts that La Nina conditions which have developed within the past few months will continue to strengthen (NOAA, 2007c). La Nina

conditions are likely to last through the winter (NOAA, 2007d). The seasonal drought outlook indicates these conditions will persist or intensify. Future temperatures are expected to be above normal over most of the country while precipitation is expected to vary by region. For the southwest region, below median precipitation amounts are expected (NWS, 2007).

4. Hydrology/Water Quality

The three fires burned within San Diego County across numerous watersheds that drain into the Pacific Ocean. The USGS Hydrologic Units (HU) that contain the fires are the San Luis Rey-Escondido (HU 18070303; 766 mi²), the San Diego (HU 18070304; 1390 mi²), and the Cottonwood-Tijuana (HU 18070305; 477 mi² within California). Within these units, the major rivers are the San Luis Rey River, the San Diego River, and Cottonwood Creek, respectively.

The Poomacha Fire burned the central portion of the San Luis Rey River watershed in smaller watersheds that are tributary to the central reach of the river. Henshaw Reservoir (259,000 acre feet), owned by Vista Irrigation District, drains the upper one third of the watershed (unburned) and therefore regulates the river to a degree.

The Witch Fire burned the upper parts of the San Diego River above El Capitan Reservoir (564,000 acre feet), which is directly upstream from the metropolitan San Diego area. The fire also burned a major portion of Santa Ysabe Creek watershed, a major tributary to the San Dieguito River that enters the ocean near Del Mar. Sutherland Lake (148,000 acre feet) is situated in the upper Santa Ysabe Creek watershed and provides a degree flow regulation.

The Harris Fire burned small watersheds tributary to the lower reaches of the Sweetwater River, which also drains to the southern part of the metropolitan San Diego area via Sweetwater Reservoir (150,000 acre feet). It also burned small watersheds tributary to the central reaches of Cottonwood Creek, which flows to the ocean near Tijuana, Mexico.

The natural hydrologic regime in the area exhibits runoff mainly due to rainfall; however, smaller amounts of runoff can be attributed to urban water use, snowmelt, and artesian springs (Wright et al., 2005). Due to the regional climate of generally dry summers and wet winters, an examination of gage data shows that mean monthly discharges are generally the highest in January through March, and lowest in July and August. Most annual maximum peak discharges and associated flooding concerns occur in the late winter through early spring.

Dispersed within the fire-affected watersheds are numerous reservoirs that were developed primarily for irrigation and municipal supply. Significantly, the San Diego County Water Authority (SDCWA) and its member agencies own and operate twenty-four surface reservoirs within the Authority's service area, with a combined capacity of approximately 571,000 acre feet (SDCWA, 2007). They provide, in effect, regulated stream systems in the middle and lower reaches of most of the major streams in the fire area. A network of pipelines in an aqueduct system delivers water to member agencies.

An inspection of the Clean Water Act Section 303(d) List offers a perspective of water quality concerns in the affected watersheds (EPA, 2007). In the HU affected, the majority of impairment listings are for coastal shorelines, bays, and harbors that are related to urban influences. Notable stream listings include the San Luis Rey River, listed for chlorides and total dissolved solids; the lower San Diego River is listed for fecal coliform, low dissolved oxygen, phosphorous, and total dissolved solids; Sutherland Reservoir is listed for color.

B. Reconnaissance Methodology and Results

The purpose of a burned area assessment is to determine if the fire caused emergency watershed conditions and if there are potential values at risk from these conditions. Identification of values at risk occurs through consultation with the individuals, tribes, State and federal agencies and through field investigation. Not all values initially identified are determined to be at risk. (Refer to Supporting Documents Appendix V.) If emergency watershed conditions are found, and values at risk are identified and confirmed, then the magnitude and scope of the emergency is mapped and described, values at risk and resources to be protected are analyzed, and treatment prescriptions are developed to protect values at risk. The most significant factor leading to emergency watershed conditions is loss of ground cover, which leads to erosion and changes in hillslope hydrologic function in the form of decreased infiltration and increased runoff. Such conditions lead to increased flooding, sedimentation and deterioration of soil condition.

Burned area evaluations included:

- Identifying fire-caused changes in soil properties and hydrologic function;
- Determining spatial extent and strength of hydrophobic soil conditions;
- Determining post-fire infiltration rates;
- Verifying and modifying the Burned Area Reflectance Classification (BARC) image to create a soil burn severity map, and if appropriate a runoff potential map;
- Identifying sediment source areas and erosion potential;
- Determining current channel and culvert capacities;
- Identifying potential flood zones; and
- Identifying potential threats to human life, property, and critical natural and cultural resources (values at risk).

The Interagency BAER Team hydrologists and soil scientists conducted aerial reconnaissance flights and field visits to review resource conditions after the fires. The main objectives of the field visits were to 1) evaluate soil burn severity and watershed response in order to identify potential flood and erosion source areas as well as debris flow hazards; 2) identify and inventory values at risk, 3) identify the physical and biological mechanisms that are creating risks; 4) review channel morphology and riparian conditions; 5) inspect hillslope conditions; and 6) determine needs for emergency stabilization.

Values at risk are human life and property, and critical natural and cultural resources located within or downstream of the fire that may be subject to damage from flooding, ash, mud and debris deposition, and hillslope erosion.

1. Soil Burn Severity

Soil burn severity mapping is intended to reflect the degree of effects caused by the fire to soil characteristics that affect soil health and hydrologic function, hence erosion rate, and runoff potential. It is not a map of vegetation consumption. In mapping soil burn severity, the team evaluated field-observable parameters such as the amount and condition of surface litter and duff remaining, soil aggregate stability, amount and condition of fine and very fine roots remaining, and surface infiltration rate (water repellency). Water repellency was evaluated by observing the length of time a water drop remained beaded on the soil. If water repellency was present, the depth and thickness of this water repellent layer was also measured. Ash and soil color may also indicate how intense the heat was and how long it remained at a given place (residence time). These parameters are compared to similar soils under unburned conditions to estimate the degree of change caused by the fire.

While soil burn severity is not based primarily on fire effects to vegetation, the team used post-fire vegetative condition as one of the visual indicators in assessing soil burn severity. In some cases there may be complete consumption of vegetation by fire, with little effect on soil properties, such as in a shrub ecosystem. Denser vegetation, with a deeper litter and duff layer, results in longer heat residence time, hence more severe effects on soil properties. For example, deep ash after a fire usually indicates a deeper litter and duff layer prior to the fire, which generally supports longer residence times. This promotes loss of soil organic cover and organic matter which are important for erosion resistance, and the formation or exacerbation of water repellent layers at or near the soil surface. The results are increased potential for runoff and soil particle detachment and transport by water, wind, and gravity. This would be mapped as high soil burn severity.

Conversely, sparse or light pre-fire vegetation such as grasses or sparse shrubs usually

have negligible litter layer and surface fuels and experience extremely rapid consumption and spread rates, with very little heat residence time at the soil surface. The result is very little alteration of soil organic matter and little or no change in soil structural stability. Water repellency, usually present under shrubs before the fire, may or may not be exacerbated by the fire. Areas between shrubs or grass crowns usually had very little fuel to burn, thus only experienced brief radiant heat as the flashy grasses and sparse shrubs burned. In these cases, soil burn severity would be low.

In between these extremes, the moderate class of soil burn severity is far more diverse in observed soil conditions and can include various vegetation types, ranging from forests to shrub communities. In the case of a forest, the litter layer may be largely consumed, but scorched needles and leaves remain in the canopy and will rapidly become mulch. This is important in re-establishing protective ground cover and soil organic matter. This factor can result in the classification of the area as moderate, rather than high. Generally, however, there will also be less destruction of soil organic matter, roots, and structure in an area mapped as moderate. In a shrub ecosystem, even where pre-fire canopy density was high, litter layer is generally thin, and while the shrub canopy may have been completely consumed by the fire, the soil structure, roots, and litter layer may remain intact beneath a thin ash layer. Above ground indicators such as size of unconsumed twigs remaining to help the team determine how long the heat may have persisted on the site. If only root stobs and large diameter twigs remain, it was likely a more intense fire with longer heat residence time, and combined with other observations of soil conditions may result in a call of high soil burn severity. More common in chaparral is a condition of remaining small diameter twigs, indicating a flashy fire with short residence time. Combined with other observations of soil conditions this usually resulted in a classification of moderate soil burn severity even though the canopy was partially consumed.

Satellite image-derived maps called Burned Area Reflectance Classification (BARC) to help us map soil burn severity classes throughout the burned landscape. A BARC is a map of degree of post-fire changes in spectral reflectance. The BARC is created by comparing near infrared and shortwave infrared reflectance values and measuring the difference between pre-fire and post-fire satellite images (see <http://www.fs.fed.us/eng/rsac/baer/barc.html> for more information). Since vegetation condition is the primary factor affecting post-fire spectral response in remotely sensed images, the BARC must be adjusted to fit ground observations before it can accurately be referred to as a soil burn severity map. Field and aerial observations provided the field data necessary to make adjustments to the BARC to create the map of soil burn severity classes. The pre-fire image was a 30m Landsat 5 scene acquired September 11, 2007, and the post-fire image was a composite of AWiFS 56m images acquired on October 26 and October 30, 2007.

2. Soil Erosion/Debris Flow

Soil erosion potential following a fire is generally increased over pre-fire potential. This is largely due to loss of soil cover (forb, grass, leaf, and needle litter), surface horizon soil organic matter responsible for structural stability, and in some cases, increased water repellency at or near the soil surface. The amount of increase over pre-fire condition is related to the degree of soil changes.

Important factors in any erosion model that are most affected by fire are the same; the amount of effective soil cover, the inherent susceptibility to soil particle detachment by wind, water, or gravity (a function of soil texture and structural stability), and the surface infiltration rate. As discussed above, these characteristics vary by degree of soil burn severity, and an area of high soil burn severity can be expected to show a larger increase in sediment production than an area of low soil burn severity. It is important to understand pre-fire erosion behavior when assessing post-fire erosion, since some areas have water repellent surfaces and inherently high erosion potential even before the fire.

For the Poomacha, Witch, and Harris fires, the Erosion Risk Management Tool (ERMiT, 2006) was used to estimate erosion under both pre-fire and post-fire conditions. The ERMiT tool is an interface developed specifically for post-fire rapid assessments, and uses the Water Erosion Prediction Project (WEPP, 2006) erosion model, which considers soil burn severity.

Debris flow potential was modeled for a 2-year, 3-hour storm and for a 10-year, 3-hour storm for selected sub-basins in the Poomacha fire using a methodology developed by Cannon, et al. (2007). The Witch and the Harris fires were not modeled for debris flow potential due to backlog of priority modeling of other southern California burned areas with steeper slopes. In general, the slopes and values at risk in the Witch and Harris fire areas were not as extreme as in the Poomacha fire area.

The debris flow hazard model considers slope gradient, aspect, soil burn severity distribution, soil characteristics, and precipitation parameters. Storm event information was obtained from NOAA Atlas 14 data, and sub-basins were selected based on potential values at risk identified by team members during field reconnaissance.

3. Watershed Response

Overland flow occurs as a result of rainfall that exceeds soil infiltration capacity and the storage capacity of depressions. On the unburned forest floor, overland flow often doesn't occur at all and when it does it follows a myriad of interlinking flow paths that constantly change as organic material (litter and duff layers) and inorganic material (rock) are encountered (Huggins and Burney, 1982). Consumption of the forest floor by fire alters the path of overland flow by reducing the overall length of the flow path, resulting in the concentration of flow into a shorter flow path. This concentration of overland flow increases the hydraulic energy of the flow and can result in rill erosion. At the watershed scale, the reduction of hillslope flow path lengths and the formation of rills that have a high water conveyance capacity reduce the times of concentration or the amount of time for overland flow to reach a defined point within the watershed.

Overland flow is also increased if there is an increase in water repellency (hydrophobicity) of the soils because of the fire. This can reduce infiltration and increase overland flow (runoff) (DeBano et al., 1967). Infiltration curves for water repellent soils reflect increasing wettability over time once the soil is placed in contact with water. Water repellency decreases (hence infiltration increases) with time as the substances responsible for hydrophobicity begin to break down, thereby increasing wettability. In general, fire-induced hydrophobicity is broken up or is sufficiently washed away within one to two years after a fire (Robichaud, 2000). The thicker and deeper the water repellent layer, the longer it will take to dissipate. Also, as noted above, many of the soils in these vegetation communities are water repellent prior to the fire (i.e.: not fire-induced), and in these cases the water repellency will likely persist. However, once soil cover and vegetative canopy begin to recover, this persistent water repellency becomes less significant to the runoff response since the litter and canopy quickly restore protection of soil and obstruction of overland flow, thus enhancing infiltration and reducing energy for runoff and erosion.

Raindrops striking exposed mineral soil with sufficient force can dislodge soil particles. This is known as splash erosion. These dislodged particles can fill in and seal pores in the soil thereby reducing infiltration. Further, once soil particles are detached by splash erosion they are more easily transported in overland flow. Surface erosion is defined as the movement of individual soil particles by a force (wind, water, or gravity), and is initiated by the planar removal of material from the soil surface (sheet erosion) or by concentrated removal of material in a downslope direction (rill erosion). Surface erosion is a function of four factors: 1) susceptibility of the soil to detachment, 2) magnitude of external forces (raindrop impact or overland flow), 3) the amount of protection available by material that reduces the magnitude of the external force (soil cover), and 4) management practices that can reduce erosion (Foster, 1982; Megahan, 1986).

On-the-ground field observations and aerial reconnaissance within and downstream of the burned area were conducted to determine potential watershed response. Channel morphology related to transport and deposition processes were noted, along with channel crossings and stream outlets. Observations included condition of riparian vegetation and the volume of sediment stored in channels and on slopes that could be mobilized. The soil burn severity map was then combined with pre-fire vegetation type to create a runoff potential map. This map reflects the degree of change in rainfall runoff for the first year following the fire.

C. Findings

1. Soil Burn Severity

The Poomacha and Witch fires were dominated by low and moderate soil burn severity, with a with high soil burn severity occurring in isolated patches in the headwaters of basins at higher elevations and in pockets of denser forest vegetation. Very low and unburned areas are also extensive within the fire perimeters. Within the Harris fire perimeter there were no areas of high soil burn severity identified, only small areas of moderate, and extensive areas of low and very low to unburned. Acres of the soil burn severity classes in each fire are listed in Table 1. The general characteristics of the soil burn severity classes as mapped in the three fires are described in Table 2.

Table 1. Acres of Soil Burn Severity Class by Fire Name

FIRE NAME	Soil Burn Severity Class	Acres	Percent of Fire
Harris Fire	1 - Unburned to Very Low	49,691	55.0
	2 - Low	39,359	43.6
	3 - Moderate	1,294	1.4
	4 - High	0	0
Harris Fire Total		90,345	100.0
Poomacha Fire	1 - Unburned to Very Low	17,810	35.9
	2 - Low	12,669	25.6
	3 - Moderate	16,966	34.2
	4 - High	2,117	4.3
Poomacha Fire Total		49,563	100.0
Witch Fire	1 - Unburned to Very Low	89,910	55.1
	2 - Low	49,118	30.1
	3 - Moderate	23,780	14.6
	4 - High	302	0.2
Witch Fire Total		163,111	100.0
Grand Total		303,019	

Table 2. General characteristics of the soil burn severity classes.

Soil Burn Severity	Characteristics
Unburned to Very Low	Unburned islands within the fire perimeter, and areas where very low severity ground fire occurred. Vegetation canopy, ground cover, and soil characteristics are not altered significantly from pre-fire conditions. A thin water repellant layer occurs throughout these areas.
Low	Shrub canopy and grasses may be scorched or consumed. Unburned and charred, but recognizable, grasses and shrub litter are present at the surface. A moderate, thin water repellent layer may be present at the ash-soil interface, under or near vegetation clumps. The water repellent layer is discontinuous and may not be fire-induced. Little to no water repellency observed between vegetation clumps. There were unburned patches of bare ground between shrubs. In forested areas, light ground fire may have occurred but litter and duff remain largely intact and forest canopy is generally unaffected.
Moderate	In chaparral areas, shrub canopy is consumed, with stobs and stems remaining. Unburned and recognizable charred leaf litter and twigs remain beneath the ash in shrub areas; a moderate, thin water repellent layer may be present but discontinuous under trees and shrubs. In forest areas, leaf litter and fine surface fuels may be consumed, but conifer or hardwood canopy is scorched but not consumed and will soon become soil cover/mulch. Unburned patches between shrubs and trees are smaller but still present.
High	Generally areas where conifer or hardwood canopy cover was dense (greater than 60-80%) and pre-fire litter layer was deeper and more continuous. Some charred, but recognizable organic material may be present in or beneath a thick ash layer. Water repellency may be present, but is also present under unburned hardwood litter and may not be fire-exacerbated.

2. Erosion Potential/Debris Flow Potential

Potential erosion has increased in the burned areas as a result of the fires. The most significant increases occurred in areas where soil burn severity was moderate or high, and where slopes are steep (greater than 35%). A high percentage of the burned areas are underlain by coarse-textured soils derived from granitic and granodiorite rocks. These soils have low cohesion and high inherent erodibility, especially on slopes over about 35%, and after removal of litter and canopy by fire. In the Poomacha fire area this is especially significant on the steep southwest-facing slopes of Palomar Mountain. The steep slopes and channels in several of these southwest-facing basins contain large amounts of loose soil and stored sediment with high potential for mobilization into surface erosion and debris flows if significant precipitation occurs over a short period of time.

A comparison of overall pre-fire surface erosion rates with post-fire surface rates in the three fire areas was made using the ERMiT erosion modeling tool. The fires are a complex mix of various combinations of soil type, burn severity, slope, and pre-fire vegetation type. The fire-caused changes in the dominant combinations were modeled, and the results are displayed in Appendix V. The absolute numbers may not be close to actual observed results, due to assumptions made in the model, and on the actual storm events that occur in the first year or two following the fire. However, it is useful in making general comparisons of expected magnitude of change following the fire.

The steep slopes and deep, unconsolidated coarse-textured soils on the southwest-facing slopes below Palomar Mountain in the Poomacha fire area are inherently unstable and susceptible to debris flows during intense rainfall events. Ample evidence of past large-scale debris flows is found in the alluvial fan deposits and in the channels flowing from those slopes, upon which the communities along the mountain front are located. Debris flows are extremely dangerous, high-energy, fast-moving events. The likelihood of debris flow occurrence in the sub-basins on these slopes is increased following fires, and is related to the overall basin gradient, basin aspect, burn severity distribution, soil properties and storm rainfall characteristics. The post-fire debris flow hazard in a number of sub-basins in the Poomacha fire area is high (Cannon, 2007).

Appendix V includes tables of the basins and their relative ratings of likelihood and volume for a 2-year, 3-hour storm event and for a 10-year, 3-hour storm event. This combination of probability and volume results in a composite hazard rating. Four of the thirty-seven sub-basins analyzed ranked as high hazard for the 2-year, 3-hour storm event, while nine ranked as high hazard for the 10-year, 3-hour storm event.

For the 2-year storm event four sub-basins have a high probability of debris flows. Reservoir Channel and Adams sub-basin have high hazard with a probability of 81% to 100% and a predicted volume range of 1,000 to 10,000 cubic meters. Tin Can Flat and Amago East sub-basins have a 61% to 80% probability of occurrence and a predicted volume range of 10,000 and 100,000 cubic meters.

For the same 2-year storm, the Pauma sub-basin had a lower probability of occurrence but a higher predicted volume greater than 100,000 cubic meters. Cedar Creek watershed, above the La Jolla campground, and the Frey, Agua Tibia, Yuima, and Potrero sub-basins have volume predictions of 10,000 to 100,000 cubic meters with probability of 21% to 60%.

For the 10-year storm event nine sub-basins have a high probability of debris flows. Of those, Tin Can Flat and the Amago East sub-basins have a predicted volume of between 10,000 and 100,000 cubic meters. The Pauma sub-basin has a lower probability of occurrence but a higher predicted volume of over 100,000 cubic meters. Agua Tibia, Frey, Potrero, Yuima, Dyche, and Cedar Creek sub-basins have a somewhat higher probability of occurrence under this storm event than the 2-year storm event.

The significance of these probabilities and volumes modeled lies in the risk to the communities and roads that are constructed in the potential outflow and depositional areas that would be impacted by events of this magnitude. In the event of high intensity storm events, especially if soils are already saturated, these debris flow events can transport car-sized boulders and boulder-laden material with high speed.

3. Watershed Response

The Witch and the Harris fires were not specifically modeled for changes in storm runoff because either no values-at-risk were identified downstream or downslope of burned areas; or the values-at-risk were determined to be at low risk of damage due to post-fire storms. The focus of the watershed modeling was the Poomacha Fire, primarily due to the numerous residential structures situated in drainage bottoms and adjacent to streams and rivers.

The USGS National Flood Frequency (NFF) Program was used to estimate peak flows for the watersheds shown on Runoff Analysis Watersheds Map located in Appendix IV. The NFF program is a computer program used to estimate the magnitude and frequency of floods for ungaged streams based on regional regression analyses of gaged basins. California is divided into six hydrologic regions with regression equations for estimating

peak discharges having recurrence intervals that range from 2 to 100 years. The Poomacha Fire is located within the South Coast Region which has the following regression equations:

$$\begin{aligned} Q2 &= 0.14 A^{0.72} P^{1.62} \\ Q5 &= 0.40 A^{0.77} P^{1.69} \\ Q10 &= 0.63 A^{0.79} P^{1.75} \\ Q25 &= 1.10 A^{0.81} P^{1.81} \\ Q50 &= 1.50 A^{0.82} P^{1.85} \\ Q100 &= 1.95 A^{0.83} P^{1.87} \end{aligned}$$

The explanatory basin variables used in the equations are drainage area (A), in square miles; mean annual precipitation (P), in inches determined from the Mean Annual Precipitation in the California Region map developed by Rantz (1969). The regression equations were developed using stream peak-discharge records of 10 years or longer, available as of 1975, at more than 700 gaging stations throughout the State. The standard errors of estimate for the regression equations range from 60 to over 100%. Waananen and Crippen (1977) referenced by the California NFF, includes an approximate procedure for increasing a rural discharge to account for the effect of urban development, as well a discussion of the influences of fire and other basin changes on flood magnitudes. According to this report researched and published by the USGS, wildfires in Southern California mountainous areas "have repeatedly been followed by debris-laden flows" and showed post-fire flood increases of 2 to 30 times in the first year following the fire (Waananen and Crippen, 1977). Furthermore, annual erosion rates increased an average of 35 times in the first year following complete consumption of dense chaparral cover and required 8-10 years before erosion rates returned to those observed prior to the fire. Based on the rainfall distribution in the fire area, the NFF peak flow results were increased only in the low range (2-5 times) to estimate post-fire flood magnitudes for the same return intervals. The results table is in Appendix V. The absolute numbers may not be close to actual observed results, due to assumptions made in the model, and on the actual storm events that occur in the first year or two following the fire. However, it is useful in making general comparisons of expected magnitude of change following the fire.

Channel cross-sections were surveyed at selected locations of concern so that channel flood capacity could be estimated and compared to modeled flood peaks obtained from the NFF Program. Channel hydraulics were analyzed using the WinXSPro Channel Cross-Section Analyzer developed by the USDA Forest Service Stream Team (Hardy, 2005). Estimated channel capacity based on hydraulic analysis of channel cross-sections were compared to pre- and post-fire flood magnitudes in Table 3.

It is apparent from the results in Table 3, as well as from field review, that many of the structures throughout the burned area that were identified as having an increased threat after the fire were flood prone prior to the fire as well. Private owners and public entities affected by the Harris, Poomacha, and Witch fires should obtain engineering and scientific help for more specific information and guidance. Treatments such as culvert enlargement, installation of small dikes or sandbags, ditch cleaning, spillway upgrades, debris removal, and protective barriers from debris flow were recommended. In many cases monitoring of sites, or maintenance, is recommended to ensure structures continue to function to their full capability. Warning signs are recommended on roads, bridges, and culverts that are vulnerable to overtopping or washout. Refer to the Values At Risk and Treatments Maps located in Appendix IV and to Section IV Recommendations, Part B Emergency Stabilization for more site specific information.

Table 3. Estimated channel capacities.

Channel Cross-Section	Approximate Stage of Concern	Estimated Channel Capacity	Passable Pre-fire Flood and Return Interval	Passable Post-fire Flood (2-5 times increase) and Return Interval
Paradise Creek at JH16 - House	4 feet	700 cfs	5-yr flood = 418 cfs May not pass 10-yr flood = 829 cfs	2-5 yr flood (500 – 800 cfs)
Cedar Creek at La Jolla Campground	7 feet	2,200 cfs	25-yr flood = 1880 cfs	5-10 yr flood (1,700 – 2,100 cfs)
East Amago Canyon upstream of Hwy 76 bridge	9 feet	11,000 cfs	500-yr flood = 6,940 cfs	50-500 yr flood (10,000 – 14,000 cfs)
West Amago upstream of Hwy 76 bridge	7 feet	2,700 cfs	500-yr flood = 2,380 cfs	25-100 yr flood (2,000 – 2,400 cfs)
Reservoir Channel at BR01 with tire dump	2 feet	1,600 cfs	500-yr flood = 868 cfs	50-500 yr flood (1,400 – 1,700 cfs)
Agua Tibia upstream of Hwy 76 bridge	13 feet	11,000 cfs	500-yr flood = 7,070 cfs	50-100 yr flood (6,000 – 11,000 cfs)
Valley Center Road Bridge and Casino, San Luis Rey River	9 feet	31,000 cfs	25-year flood = 28,900 cfs	5-10 yr flood (24,000 – 29,000 cfs)

Overall, the Harris Fire was mapped as predominantly low runoff potential with isolated areas of moderate runoff potential, corresponding with the mosaic of predominately unburned and low soil burn severity. The Witch Fire contained more areas of moderate and high runoff potential than the Harris Fire, but still was predominantly a mosaic of unburned and low, also corresponding to the large amount of unburned and low soil burn severity. The primary watershed response of the Harris and Witch fires is expected to include: 1) an initial flush of ash and organic debris; and 2) small amounts of localized erosion and deposition in response to typical precipitation events. Field investigations indicated moderate water repellency in unburned areas, as well as areas within the fire, indicating a natural tendency to repel water. As a result, post-fire runoff and erosion are not expected to increase significantly over pre-fire levels. Debris deposition and recent alluvial deposits were observed in channels and foothills of the burned area. These are expected to continue to occur at natural background levels with a minimal increase of sediment or debris as a result of the fire. Temporary increases in spring flow and stream baseflow may occur due to the reduction in interception and evapotranspiration where dense shrub canopies were consumed by the fire. However, these short-term increases are expected to return to pre-fire levels within 1-5 years as fire-adapted shrub communities re-sprout.

In contrast, the primary watershed response of the Poomacha fire is largely dependent on the type of precipitation events that occurs following the fire. If rain events are low-intensity, and limited in total rain amount, an initial flush of ash and organic debris and localized erosion and deposition are expected. However, if rain events are higher in

intensity or total rainfall amount, similar to storms experienced in the area throughout the past (NOAA, 2007a), the watershed response can be expected to include similar damaging events, such as significant flash flooding, debris flows, and extensive damage to property and infrastructure. The potential for increased threats from flooding can extend miles from the fire perimeter, as documented for these earlier events, especially once flood waters are in the San Luis Rey River channel. Low soil permeability, existing soil surface crusting, slope steepness, and occurrence of rainfall anomalies are all important factors contributing to the potential for runoff and debris flows from the Poomacha Fire.

Throughout all fire areas, vegetation recovery is largely dependant on climatic cycles. If wet winters occur, vegetation recovery could be rapid, with forbs and grasses providing ground cover similar to that observed in unburned areas throughout the fires. By the second winter season, forbs, grasses, and re-established shrubs should provide sufficient cover to reduce any increase in watershed response to near pre-fire levels. Once sprouting vegetation begins to produce brushy crowns and a duff/litter layer, watershed response will be reduced further. However, if winters are dry, vegetation recovery will be slow, and thus the establishment of ground cover and shrub communities will be slow, and watershed response will remain slightly elevated over pre-fire conditions. The recovery of some areas of these Southern California fires may also be slowed than what past experience suggests, due to the extended drought and extensive wildfires in recent years. In particular, those areas of the current fires that overlap with areas that burned in 2003 may experience significant delay in reestablishment of the chaparral communities (Keeley, 2007, personal communication).

The First Year Runoff Potential Map found in Appendix IV reflects the degree of change in rainfall runoff for the first year following the fire. It captures both changes in soil function and canopy cover, reflecting the expected hydrologic response for the first year. The map is a modification of the soil burn severity classification. In areas of dense shrubs and moderate soil burn severity, the runoff potential is rated high to reflect the loss of leaf canopy. After the first year following the fire, recovery of vegetative canopy is generally sufficient to reduce the runoff potential significantly, thus reducing the runoff potential back to near pre-fire levels over the next several years.

The effect of wildfires on storm runoff is well documented. Wildfires typically cause an increase in watershed responsiveness to precipitation events. Burned watersheds can quickly yield runoff due to the removal of protective tree and shrub canopies and litter and duff layers, thus producing flash floods. Burned areas often respond to the local storm events in a much flashier way. The amount of water yield increase is variable and it is often orders of magnitude larger than pre-fire events. These negative impacts are predominantly true in watersheds that experienced significant consumption of the shrub community and moderate to high soil burn severity effects. Fires may increase the number of runoff events as well since it generally takes a smaller storm to trigger runoff until vegetation begins to recover. Peak flow increases from the fire may also be augmented by debris flows of floatable and transportable material within the active channel areas and steep, incised drainages.

Most of the drainages of concern in the Poomacha Fire are small, steep basins comprised of naturally erodible soils subject to an orographic effect created by the Palomar ridgeline which causes storms to stall out and essentially dump large amounts of rain. Therefore, significant runoff, erosion, sediment and debris delivery is possible along the southwest-facing slopes along State Highway 76 and the west-facing drainages along Valley Center Road. This includes the communities of Rincon, Pauma, Pala, and La Jolla within the Pauma Valley.

A consequence of significant runoff, erosion, sediment and debris delivery is a short-term degradation of water quality as ash, sediment, and burned organic debris are delivered to streams and reservoirs within and downstream of burned areas. The impacts of this effect depend largely on the vegetative recovery times in combination with storm characteristics in the same time period.

4. Values at Risk

Aerial reconnaissance and field evaluations were conducted throughout the three fires to determine if threats to life, property, or critical cultural or natural resources were present on federal lands and in a few instances private lands in close proximity to federal lands. Numerous commercial, residential, and out-buildings structures; campgrounds; water conveyance and impoundment facilities; roads; and cultural sites were evaluated for risk from increased erosion, flooding or debris flows. Over one hundred values at risk are listed in Table 4 and displayed on the Values at Risk Map in Appendix IV. Each value at risk on the map can be cross referenced with the Field ID code.

A preliminary assessment of risk to non-federal lands and to major travel routes from increased runoff, erosion, and debris flow was conducted using a GIS process (refer to Areas at Risk and Major Travel Routes at Risk Maps in Appendix IV). This process intersected the first year runoff response areas of moderate and high with slope. Slopes greater than 35% combined with greater than 50% runoff potential were rated as high risk. Slopes less than 35% combined with greater than 50% runoff potential were rated as moderate risk. The non-federal lands that were selected as a result of this process were the areas along the west and southwest-facing slopes of Palomar Mountain in the Poomacha fire and the areas south and west of Black Mountain Lookout in the Witch Fire. The major travel routes that were selected as a result of this process were Highway 76, South Grade Road, and Black Canyon Road. These findings are consistent with the team's aerial reconnaissance and field evaluations.

Table 4. Values at Risk

Field ID	Fire	Value at Risk	Potential Threat	Level of Risk	Treatment	Comments
CJ01	Harris	Road	Flooding	Moderate	Asphalt Waterbar	San Miguel Mtn Road
CJ02	Harris	Road	Flooding	Moderate	Asphalt Waterbar	San Miguel Mtn Road
CJ03	Harris	Road	Flooding	Moderate	Install Drain Outlet	San Miguel Mtn Road
CJ04	Harris	Road	Flooding	Moderate	Trail Re-Contour	San Miguel Mtn Road
CJ05	Harris	Road	Flooding	Moderate	Asphalt Waterbar	San Miguel Mtn Road
CJ06	Harris	Road	Flooding	Moderate	Basin Cleanout	San Miguel Mtn Road
CJ08	Harris	Road	Flooding	Moderate	Install Drain Outlet	San Miguel Mtn Road
CJ09	Harris	Road	Flooding	Moderate	Install Drain Outlet	San Miguel Mtn Road
CJ10	Harris	Road	Flooding	Moderate	Install Drain Outlet	San Miguel Mtn Road
CJ11	Harris	Road	Flooding	Moderate	Asphalt Waterbar	San Miguel Mtn Road
CJ12	Harris	Road	Flooding	Moderate	Asphalt Waterbar	San Miguel Mtn Road
JG01	Harris	House	Flooding	Low	None	Mitrovich Residence
JG02	Harris	Low Water Crossing	Flooding	High	Flood Hazard Signs	
JG03	Harris	Pond / Dam	Flooding	Low	Spillway Repair	Waterfowl pond with dam; eroded spillway
JG04	Harris	Culvert	Flooding	Low	None	3x 7-FT CMPs downstream, 12 inch scrubline

Field ID	Fire	Value at Risk	Potential Threat	Level of Risk	Treatment	Comments
JG05	Harris	Low Water Crossing	Flooding	Moderate	Flood Hazard Signs	
JG06	Harris	Campground	Flooding	Moderate	None	THOUSAND TRAILS CAMPGROUND
JG11	Harris	Culvert	Flooding	Low	None	5-36in Concrete Pipes w/ headwall (2003 VAR)
JG12	Harris	Culvert	Flooding	Low	None	6-ft CMP w/ 12-in scrubline, Marron Road
JG13	Harris	Culvert	Flooding	Moderate	None	3-ft CMP headwall, 6-in scrubline, Marron Rd
JG14	Harris	Bridge	Debris Flow	High	Flood Hazard Signs	Existing high risk
JG15	Harris	Low Water Crossing	Flooding	Moderate	Flood Hazard Sign	Otay Lakes Road
JG16	Harris	Low Water Crossing	Flooding	Moderate	Flood Hazard Sign	Low water crossings
JG17	Harris	House	Flooding	Moderate	NRCS evaluation	GPSd during aerial recon, house in drainage bottom
JG18	Harris	Bridge	Flooding	Very Low	None	State Hwy 94
JG19	Harris	Bridge	Flooding	Very Low	None	Barrett Smith Road
JH15	Poomacha	Bridge	Flooding	Moderate	Clean	Railcar bed over 3 CMPs 18-in, 90% blocked
BR01	Poomacha	Houses	Debris Flow	High	Channel Clearing, Bank Stabilization	500-1000 tires and floatable debris
BR02	Poomacha	House	Debris Flow, Flood	High	K-rails	1005 Loop Road
BR03	Poomacha	House	Flooding	Low	Sandbags	Luke Dixon Residence
BR04	Poomacha	Houses	Debris Flow, Flood	High	K-rails	1017 and 1020B Cul de Sac Road off of Loop Road
BR05	Poomacha	House	Flooding	Low	Sandbags	1001 Loop Road
BR06	Poomacha	House	Flooding	Low	Sandbags	1002 Loop Road
BR07	Poomacha	House	Flooding	Low	Sandbags	1003 Loop Road
BR08	Poomacha	House	Flooding	Moderate	Sandbags	1004 Loop Road
BR09	Poomacha	House	Debris Flow, Flood	High	K-rails, Sandbags	1014 Pauma Reservation Rd
BR10	Poomacha	House	Debris Flow, Flood	High	K-rails	1012A Pauma Reservation Road
BR11	Poomacha	House	Flooding	Low	Sandbags	1029 Pauma Reservation Road
BR12	Poomacha	House	Flooding	Moderate	Sand Bags	1019 Loop Road
BR13	Poomacha	Houses	Flooding	High	Sandbags	1018 Cul de Sac and 1018 Loop Road
BR14	Poomacha	Houses	Flooding	Moderate	Sandbags	1022A and 1023 Cul de Sac
BR15	Poomacha	Houses	Debris Flow, Flood	High	None - Private Land	2 trailer houses, possibly uninhabited
BR16	Poomacha	House	Debris Flow, Flood	Moderate	K-rails	Private land, 16054 Pauma Reservation Road, Rental
BR17	Poomacha	House	Debris Flow, Flood	Moderate	K-rails	Private land, 16100 Pauma Reservation Road, Rental
BR18	Poomacha	House	Flooding	Moderate	Sandbags	1037 Loop Road
BR19	Poomacha	House	Debris Flow, Flood	High	K-rails	Private Land, 16043 Adams Road, ONLY SPEAK SPANISH
BR20	Poomacha	House	Debris Flow, Flood	High	K-rails	1011 Loop Road
BR21	Poomacha	House	Debris Flow, flood	High	K-Rails	800 Pauma Reservation Road

Field ID	Fire	Value at Risk	Potential Threat	Level of Risk	Treatment	Comments
JH04	Poomacha	House	Flooding	Moderate	Sandbags	Green-blue trailer home
JH05A	Poomacha	Road	Flooding	Moderate	Hazard Warning Signs, Post-storm cleanup	North Calac Road
JH05B	Poomacha	Road	Flooding	Moderate	Hazard Warning Signs, Post-storm cleanup	North Calac Road
JH05C	Poomacha	Road	Flooding	Moderate	Hazard Warning Signs, Post-storm cleanup	North Calac Road
JH05D	Poomacha	Road	Flooding	Moderate	Hazard Warning Signs, Post-storm cleanup	North Calac Road
JH07	Poomacha	Water Facility	Flooding	Moderate	K-Rails	Pumphouse along Paradise Creek
JH08	Poomacha	House	Flooding	Moderate	Sandbags	Last house on Rocky Top Lane
JH09	Poomacha	House	Flooding	Moderate	Sandbags	Residents Do Not Speak English
JH10	Poomacha	House	Flooding	Moderate	Sandbags	10033 Cemetery Road
JH11	Poomacha	Houses	Flooding	Moderate	Sandbags	Upslope of multiple residences
JH12	Poomacha	Cemetery	Flooding	Moderate	Sandbags	Historic Resource
JH13	Poomacha	Low Water Crossing	Flooding	Low	Clean	Crossing on Paradise Creek
JH14	Poomacha	Road	Flooding	Moderate	Channel Debris Clear	Clean Riprap, sandbags, debris US-side Paradise Rd
JH16	Poomacha	House	Flooding	Moderate	Channel Debris Clear	Clear large woody debris from channel
JH17	Poomacha	Pond / Dam	Flooding	Moderate	Pre and Post-storm cleanup	Upslope of Valley Center Road
JH18	Poomacha	House	Mudflow	Low	Sandbags	Upslope from 51008 Kuupat Street
JH19	Poomacha	Pond / Dam	Flooding	Moderate	Pre and Post-storm cleanup	Upslope of Valley Center Road
JH20	Poomacha	House	Mud Flow	Moderate	Sandbags	54004, South Cul de Sac off Kuupat Street
JH22	Poomacha	House	Mudflow	Moderate	Sandbags	Above houses on Kolb Road
PA01	Poomacha	Houses	Debris Flow	High	Channel Clearing, Culvert Cleaning, Tree Felling	Large Construction Material debris, 2 gas tanks
PA02	Poomacha	House	Debris Flow, Flood	High	K-rails	Loma Linda Road
PA03	Poomacha	House	Flooding	Moderate	Sandbags	La Paz Road
R0P1	Poomacha	House	Flooding/Debris	High	K-rails	Ted Nelson Residence
RP02	Poomacha	House	Flooding/Debris	High	K-rails	Cousin of Ted Nelson Residence
RP03	Poomacha	House	Flooding/Debris	High	K-rails	Barrisford Residence
RP04	Poomacha	Road	Floatable Debris	Moderate	Channel Clearing	Hwy 76 xing, natural and man-made debris
RP05	Poomacha	House	Flooding	Moderate	K-rails, install low water crossing	Willie Nelson Residence
RP05A	Poomacha	Gas Station	Flooding	High	K-rails	Hwy 76 & Cedar Creek drainage
RP06	Poomacha	Campground	Flooding	High	Seasonal Closure	La Jolla Campground - close during wet season(s)
RP07	Poomacha	Road	Floatable Debris	Moderate	Channel Clearing	Hwy 76 xing, Cars, appliances, and fill in channel
RP12	Poomacha	Water Facility	Flooding/Debris	High	Post-storm cleanup and	Yapitcha Irrigation System diversion point

Field ID	Fire	Value at Risk	Potential Threat	Level of Risk	Treatment	Comments
					maintenance	
RP13	Poomacha	Cemetery	Flooding/Debris	Moderate	K-rails	Church Road Cemetery
RP15	Poomacha	Bridge	Flooding	Low	NA	bridge burned
RP16	Poomacha	Bridge	Flooding	Low	NA	bridge burned
RP18	Poomacha	Water Facility	WQ sediment	Moderate	Nothing Feasible	open diversion canal out of dam
RP19	Poomacha	Pond / Dam	Overtopping/Scour	Mod-High/Low	None	15ft high concrete dam, Spillway, sediment present
RP20	Poomacha	Pond / Dam	Overtopping/Scour	Mod-High/Low	None	15ft high concrete dam, sediment present
RP21	Poomacha	Culvert	Flooding/Debris	High	Nothing Feasible, replace post-storm if needed	Harold Water Pipe
RP22	Poomacha	House	Flooding	High	K-rails w/ sandbags	Paradise
RP24	Poomacha	Nursery	Flooding	Moderate	None	Old Nursery, commercial & residential off channel
RP52	Poomacha	House	Flooding	High	Sand bags	History of post-fire flooding
	Poomacha	Road	Flooding	Moderate	Flood Hazard Signs	Hwy 76
DM01	Witch	Water Facility	Debris Flow	Low	None	Sutherland Aquaduct, channel crossing
DM02	Witch	Water Facility	Debris Flow	Low	None	Sutherland Aquaduct, channel crossing
DM03	Witch	Water Facility	Debris Flow	Low	None	Sutherland Aquaduct, channel crossing
JH01	Witch	House	Mudflow	Moderate	Sandbags	1196 Barona Road
JH02	Witch	House	Mudflow	High	Sandbags	1164 Barona Road
JH03	Witch	House	Flooding	Moderate	Channel Debris Clear	drainage behind 1164 Barona rd
MG01	Witch	Culvert	Flooding/Debris	Moderate	K-rails, Sandbags, Culvert Cleaning	Across from house #208
MG02	Witch	Culvert	Flooding/Debris	Moderate	K-rails, Sandbags, Culvert Cleaning	2 house south and across from #208
MG03	Witch	House	Flooding/Debris	Moderate	K-rails, Sandbags, Culvert Cleaning	Between #111 and 112
MG04	Witch	House	Flooding/Debris	Moderate	K-rails, Sandbags, Culvert Cleaning	House #109
MG05	Witch	Pond / Dam	Sedimentation	Moderate	Post-storm cleanout	Gully headcutting

IV. RECOMMENDATIONS

Based on the results of the above observations:

B. Emergency Stabilization – Fire Suppression Repair

No recommendation under this category.

C. Emergency Stabilization

Early Warning System – 21 BIA

Purchase and install automated stream gauges, rain gauges, radio-repeaters, weather stations, warning sirens and base stations to provide downstream warnings to the

communities of La Jolla, Pauma, Rincon and Pala Reservations on impending floods resulting from fire in the upstream watershed area.

Road Debris Removal – 25 BIA; 18 FWS

During major storm events low water crossings, culverts, and other sections of roadways can be expected to flood or experience significant surface erosion as a result of the effects to watershed conditions from the fires. Flood events will erode and/or deposit sediment, organic debris, and boulders on roadways and making them impassable and unsafe. This specification provides for maintenance and removal of sediment, debris, and rock fall for both BIA and FWS.

Flood Hazard Signs – 14 BIA; 11 BLM; 15 FWS

Flood and mudflow hazard warning signs should be developed for immediate installation at low water crossings for the protection of life and property. These signs are necessary to inform the public of immediate danger posed by flash floods and mudflow events generated by storms.

Construct Asphalt Water Bar – 13 FWS

Water bars placed cross slope on a paved out-sloped single lane road used for access to F&WS property and multi-communication towers. Water bars are equivalent to 15 mph speed bumps extending to cut slope of the road and extending to the edge of the outside road slope. A 4 foot water bar (Spur) is installed 8 feet uphill of main water bar to reduce concentrated flow from the cut bank side of the road. Asphalt pad (Outlet) installed as a stable outlet for concentrated flow, from the water bar, across the earth road shoulder. Water bars on the asphalt roadway shall be painted white for safety

Place Road Drain Outlets – 14 FWS

Drain outlets are placed in locations in places where sheet flow from the road is concentrated on the embankments (fill slopes) that need protection. Drain outlets are constructed from a sheet metal headwall with a 24 inch sheet metal transition attached to an 18 inch CMP cut in half longwise. See page 118, Figure 70 of BAER Treatments Catalog (Dec. 2006).

Channel Debris Cleanout – BIA 18

It is expected that high flow events will be larger than normal as a result of the Poomacha and Witch Fires with a concomitant increase in sediment loadings. As a result, it is recommended that stream and drainage channels adjacent to reservation roads and housing be cleared of debris such as large floatable wood and brush, rock, and other unnecessary flow impediments to facilitate passage of flood flows.

Culverts Cleaning – BIA 19

Culverts that are in areas at risk to flooding and/or debris flows should be cleaned to ensure maximum flow capacity. Subsequent to flood events culverts should be inspected and if necessary re-cleaned.

Culvert Removal/Replacement – BIA 20

Remove culverts that are undersized for anticipated higher streamflows as a result of the fires. Where feasible, replace undersized culverts with culverts capable of conveying anticipated post-fire flows.

Structural Protection – BIA 16

Place sandbags and K rails around structures to divert flood flows and debris flows. Several homes and other facilities lie within flood and debris flow prone areas within and downstream of the burned areas. Although emergency stabilization treatments cannot prevent flooding of or damage to structures during all magnitudes of storms, treatments can be effective in reducing flooding and damage. K-rails (jersey barriers) are an effective

treatment where high velocity debris flows that may carry large debris such as boulders, limbs, etc. are expected to occur, not where low velocity flooding or sediment deposition may occur. Sandbags are an effective treatment where low velocity flows, or nuisance sediment deposits are expected to occur, not where higher velocity debris (i.e., boulders) flows may occur. Place K-rails (jersey barriers) and/or sandbags in strategic locations around structures to divert floods, mudflows and rolling rock away from structures. Because past experience has shown the sandbags deteriorate in ultra-violet light, a sample of sandbags will be coated with exterior latex paint to evaluate effectiveness of reducing degradation due to UV light.

Spillway Repair – FWS 16

Spillway has eroded from past storm events and the headcut is nearing spillway crest of the reservoir. The spillway is on the north side of the channel and dam on FWS property. Past events have eroded the spillway to a series of hard points in the bottom of the gully. In order to safely pass flood flows through the spillway and prevent draining the pond the spillway will be repaired.

Bank Stabilization – BIA 17

Engineer and implement bank stabilization for a reservoir upstream of Pauma Reservation, in the Pauma Valley, San Diego County. Bank stabilization of the reservoir is required to protect lives and property on the Pauma Reservation. The reservoir is located on private land owned by the Pauma Valley Mutual Water Company (PVMWC), which is located upstream of the Pauma Reservation. The reservoir is at risk from post fire flooding and debris flows, which may destabilize the bank supporting the reservoir. If the reservoir fails, 1.3-million gallons of water will be released to the channel (no name) below, flooding 12 homes (or more) on Pauma Reservation. This specification is also associated with channel cleaning to remove debris, which includes approximately 500 to 1000 tires. The channel is located on private land owned by Steve Taft. The PVMWC and Steve Taft have signed a Memorandum of Agreement with BIA-SCA allowing channel clearing and bank stabilization. The engineering study must be performed prior to the removal of the tires. Implementation of the designed stabilization treatment must occur immediately after removal of the tires. The County of San Diego has reportedly assumed responsibility for emergency tire removal and disposal at no cost to the PVMWC or Mr. Taft.

Irrigation system maintenance – BIA 23

Remove sediment and debris from irrigation diversions. It is anticipated that there will be higher than normal flow events with increased sediment loadings to the irrigation diversions on the La Jolla Reservation as a result of the Poomacha Fire. Increased maintenance activities following high runoff events will ensure proper functioning of the irrigation systems and minimize potential damage to facilities. Irrigation systems include the Cedar Creek, Luket, and Yapitcha. The La Jolla tribe has stream diversions for irrigating pasturelands and family gardens on the reservation. The increase in ash and sediment post fire will require additional cleanout at the diversions and flushing of the pipelines to prevent clogging.

Interceptor Ditch Cleaning – BIA 22

The Witch fire burned the hill slopes adjacent to the Mesa Grande tribal housing area in Black Canyon. Post fire and periodic cleaning of approximately 4100 ft. of concrete lined interception (Eye-brow) ditches along hill slopes above the tribal house is needed to maintain integrity and functionality of the ditches, which divert sheet flows and mud from entering the tribal housing area. These concrete lined ditches capture overland flow and sediment to prevent gullies from forming on cut slopes. Cleaning will reduce the chances debris flow and sediment will clog these ditches and impact resources at the base of the cut slopes such as roads and homes.

Maintain Sediment Basin – BIA 12

Remove debris and fill from sediment basins to maximize storage capacity. After major storm events, remove debris and sediment fill to maintain storage capacity. The Rincon tribe installed sediment catchments in unnamed tributaries of Paradise Creek after the 2003 Paradise fire to settle out sediments eroded from hillslopes. After the recent Poomacha fire, ash and sediment will once again erode off the hillslopes. These basins will require frequent clean out to maintain capacity and prevent flows from overtopping their channels. Mesa Grande maintains a larger basin within its bison range that will fill with sediment and ash. This basin will require infrequent cleaning to maintain capacity.

Low Water Crossing – BIA 24

Remove culverts that are undersized for anticipated high stream flow events. Install low water crossings to permit continued access to areas above the crossing after culverts are removed. A culvert on a small unnamed tributary to the San Luis Rey River flows through the housing development on Poomacha Street. An undersized culvert is at risk to flooding and debris. Replacement of this culvert will alleviate the risk to blockage of the culvert and potential damage to a nearby residence. Replace existing culvert with a low water crossing.

Road Re-Contouring – FWS 17

A 600 ft trail from vehicle traffic following the ridgeline has eroded down the tire tracks from concentrated flows. If not repaired, this gully will contribute a disproportionate share of sediment to the roadway during storm events after the fire. Abandon road bed connecting two switch backs is concentrating flow onto San Miguel Road. Post-fire storm events will increase the amount of sediment and runoff directed across the main road. Re-contouring will eliminate the concentrated flow directed to the road.

Sandbag UV Protection – BIA 15

Sand Bag treatments can fail due to sun light exposure deterioration of the bags. Spray painting the installed sandbags will extend the useful life of the treatments past the second rainy season.

Water System Assessment – BIA 26

The domestic water system at La Jolla supplies water from its storage tanks through a network of pipes lying under the access road. The pipes are high pressure pipes kept in check by the road weight and compaction. Runoff flows from the Poomacha fire will accelerate erosion on the road and threatens the integrity of the water pipes. An assessment should be completed to determine risk to the La Jolla domestic water system.

Treatments Considered But Not Recommended

Hillslope treatments were considered for the Poomacha, Witch, and Harris fires. The treatments considered were hydromulching, straw mulching, seeding, contour felled logs, log erosion barriers, and fiber rolls. Environmental considerations were evaluated to determine treatment suitability which includes slope grade, slope length, soil burn severity, canopy cover, land ownership, watershed response, and access.

For the Harris fire the low soil burn severity and runoff potential of the area excluded the need for hillslope treatments. The Poomacha and Witch fires have greater than 50% slopes where values at risk are located and the soil burn severity was high within the burned area also excluding hillslope treatments (Napper, 2006). Contour felled logs and log erosion barriers are not feasible due to the amount of surface rock, undulating soil surfaces, and lack of trees. One treatment of fiber rolls was recommended for a culturally sensitive area within the Poomacha Fire with slopes of 30 to 40%. See Cultural Resources Assessment.

D. Rehabilitation

No recommendation under this category.

E. Management Recommendations – Non-Specification Related

Maintenance and culvert cleaning of Black Canyon Road

During major storm events, sections of the Black Canyon Road can be expected to flood. Flood events may erode road crossings or deposit sediment, rocks and debris on the roadway or in the bar ditch, making roads impassible and unsafe for vehicle travel.

Flood warning signs on Black Canyon Road

During major storm events, sections of the Black Canyon Road can be expected to flood. Flood warning signs will alert travelers to potentially hazardous road conditions during and immediately after storm events.

Close Wilderness Gardens campground during the rainy season

During the rainy season, the Wilderness Gardens campground is at increased risk of floods and debris flows as a result of post-fire watershed conditions. Closing the campground during the rainy season (October through April) will ensure that campers are not present during this high risk time.

Close La Jolla campground during the rainy season

During the rainy season, the La Jolla campground is at increased risk of floods and debris flows as a result of post-fire watershed conditions. Closing the campground during the rainy season (October through April) will ensure that campers are not present during this high risk time. Prior to the rainy season beginning in 2008 (October 2008 through April 2008) the Cedar Creek watershed should be re-assessed by a qualified hydrologist and/or geologist to determine if the post-fire risk of flood and debris flows has decreased to an acceptable level of risk to allow campers back into the campground.

Improve Control Structure

Flooding is expected to occur in the San Luis Rey drainage. A diversion channel exists along the San Luis Rey where it enters the Rincon Reservation. Water is diverted into a sediment detention pond. The diversion channel needs to be improved in order to effectively divert some of the flood flows away from the main channel. This will involve excavating soil material and reshaping the diversion channel to ensure that it captures some of the flood flows.

Rincon Private Inholding Trailers

Trailers in a stream channel to the east of Rincon Reservation on an extension of McCormick Road are vulnerable to flooding and debris flows from burned drainages upstream. It is recommended that the NRCS conduct a hazard assessment and mitigation. This also applies to numerous private holdings in and around the fire areas.

Replace railcar bridge on Paradise Creek

A railcar bridge across Paradise Creek to the residence of 20 Turner Lane is poorly constructed and obstructs flow. It is recommended that this structure be removed and replaced with a proper concrete low-water crossing. This would insure efficient conveyance of water and sediment across the road while minimizing the need for maintenance of the road following storms.

Barrett Stage Historic Road – Close to Motorized Vehicles

This historic stage coach trail, now a 4x4 truck trail, was cut through steep, unstable hill slopes comprised of decomposed granite, making it susceptible to severe erosion. The entire segment exhibits deep gullies currently and will be extremely difficult to maintain as

an open road. Maintenance or repairs to the road would require widening the trail which would cut even deeper into the unstable hillslope, thus continuing to exacerbate the existing instability. If closure is not feasible due to Border Patrol needs, it is recommended that the BLM stipulate what maintenance, repairs, and upgrade activities and structures are allowed.

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BURNED AREA EMERGENCY STABILIZATION PLAN

2007 SOUTHERN CALIFORNIA FIRES

VEGETATION RESOURCE ASSESSMENT

I. OBJECTIVES

- Evaluate and assess fire and suppression impacts to vegetative resources.
- Determine emergency stabilization and monitoring needs supported by specifications to aid in vegetative recovery and soil stabilization efforts and to mitigate impacts to sensitive plant species.
- Evaluate the potential for non-native invasive plant species encroachment into native plant communities and sensitive plant species habitat within the fire area and determine stabilization and monitoring needs to mitigate encroachment.
- Determine effects of fire and suppression impacts to sensitive plant species, including federally listed Threatened and Endangered (T&E) species, agency designated sensitive or special status species, and tribally sensitive plant species.
- Assess Pauma Forest Reserve for potential salvage/reforestation needs.
- Assess imminent and long-term tree hazards to the public and property and recommend or implement mitigation measures.

II. ISSUES

- Short and long-term effects of the fire on plant communities and vegetative resources including T & E and sensitive plant species.
- Potential for invasion of impacted lands by noxious weeds and non-native invasive plant species.
- Tree hazards that may pose a threat to public, worker safety, or property.
- Reestablishment of forest cover within timber, riparian, oak woodland, and oak savannah stands.
- Recovery of chaparral communities in altered fire regimes.
- Potential timber/firewood salvage.

III. OBSERVATIONS

This report addresses known and potential impacts to vegetative resources on US Department of the Interior administered lands and tribal lands within the fires. Findings and recommendations contained in this assessment are based upon information obtained from personal interviews and meetings with staff from the Bureau of Land Management – Palm Springs-South Coast Field Office, Bureau of Indian Affairs - Southern California Agency (BIA-SCA), Bureau of Indian Affairs, Pacific Regional Office US Fish and Wildlife Service (FWS) – Carlsbad Ecological Services Office and San Diego National Wildlife Refuge, Rincon (RIN) and La Jolla (LJO) Reservations, Natural Resources Conservation Service – Escondido Field Office (NRCS-EFO), US Geological Survey (USGS), private landowners, Burned Area Emergency Response (BAER) team specialists, literature reviews, and field reconnaissance of the fire areas. Table 1 shows the acres of lands impacted by the fires by agency/owner.

Table 1 – Acres Impacted by the Fires by Agency/Owner

Acres by Agency/Owner Impacted by the Fires				
Agency/Owner		Harris	Poomacha	Witch
BLM		18,217	2,683	1,066
FWS		4,137	0	0
BIA	La Jolla	0	8,697	0
	Pala	0	2,220	0
	Pala Fee Lands	0	1,237	0
	Pauma-Yuima	0	5,320	0
	Rincon	0	3,580	0
	San Pasqual	0	7	0
	Allotments	0	236	0
	Barona	0	0	887
	Capitan Grande	0	0	4,458
	Inaja-Cosmit	0	0	319
	Mesa Grande	0	0	1,817
	Santa Ysabel	0	0	2,820
Other		67,991	25,582	151,743
TOTAL		90,345	49,562	163,110

A. Background

Harris Fire

The Harris Fire started on October 21, 2007 at 0930 hours east of the town of Potrero in heavily vegetated chaparral. The fire was driven by Santa Ana winds that reached 50 miles per hour (mph) during the day and 70 mph at night. From Potrero the Harris Fire burned west to Chula Vista and the San Diego National Wildlife Refuge. The fire is bordered on the south by Mexico and on the north by Lyons Valley, Barrett Lake and the Cleveland National Forest. The Harris Fire was contained on October 31 at 90,345 acres.

Witch Fire

The Witch Fire started on October 21, 2007 at 1230 hours near the Witch Creek fire station on Highway 78. A combination of topography, critical fuel moistures and strong Santa Ana winds created a rate of spread at about 5 mph. The above factors and wind speeds reaching 40 to 50 mph with gusts up to 80 mph resulted in the fire traveling over 30 miles in three days. The boundary of the fire is the city of Rancho Santa Fe on the west, Santa Ysabel Reservation on the north, the town of Santa Ysabel in the east, and El Capitan Reservoir in the south. The Witch Fire was contained on October 31 at 163,110 acres.

Poomacha Fire

The Poomacha fire started on October 23, 2007 at 0313 hours on the La Jolla Reservation. Heavy fuel loads in chaparral and oak woodlands that had not burned since 1922, winds up to 37 mph, low relative humidity, and a second year of drought resulted in the fire spreading over 2 miles in less than 10 minutes at a rate of spread of 12-24 mph. The fire is bordered on the north by the Agua Tibia Wilderness (Cleveland National Forest) and Palomar Road, La Jolla reservation on the east, the Witch Fire to the south, and the Rincon Reservation in the west. The Poomacha Fire was contained on November 8 at 49,562 acres.

Vegetation

A variety of vegetation communities exist within the boundaries of the Poomacha, Witch and Harris fires, all of which fall in the South Coast bioregion. Vegetation distribution and patterns in the South Coast bioregion are influenced by topography, climate, soil moisture, and disturbance. The region is a Mediterranean climate having cool, wet winters and hot, dry summers. Precipitation varies from 9 to 28 inches, the lowest recorded at Otay Lakes and the high on Palomar Mountain. Most of the precipitation occurs from November to April. In this part of southern California neither drought nor lightning are the main contributors of vegetation patterns. The Santa Ana (or foehn) winds are the primary factor in determining burning patterns. The Santa Ana winds often result in large fires regardless of drought. Drought is an important factor in regards to burning patterns in that it extends the burning season. Another factor further compounding the fire regime within the burned areas is that fire frequency has increased in recent decades due to population growth. (Keeley 2006).

The South Coast bioregion is a complex mosaic of grassland, shrubland, forest, and woodland that forms a relatively fine-grained landscape relative to most wildfires, which usually burn large enough areas to encompass a diversity of vegetation types and associations. Thus, fire regimes vary on a rather coarse scale, and within a vegetation type there is limited association of fire regimes with specific plant associations.

A number of broad community types occur in the burned areas including oak woodlands, forests, chaparral, coastal sage scrub, riparian, and wetlands. Listed below are descriptions of the vegetation cover types found on federal and tribal lands within the fire perimeters. There are numerous plant alliances and associations that exist within the fire perimeters. For purposes of displaying vegetation on a map and for describing them in a format such as this plan, community types were lumped into 12 vegetation types. Communities that comprised a very small portion of the burned area were included in types that they are associated with.

The map layer created for this assessment was derived from the LANDFIRE Existing Vegetation Layer (USDA Forest Service 2006), and the LANDFIRE National Existing Vegetation Type Layer (USGS 2006). The vegetation cover descriptions are based partly on the Southwest ReGap Vegetation Classification (NatureServe, 2004). The vegetation classification is based on the National Vegetation Classification System (NVCS) and partly on conventions found in Sawyer and Keeler-Wolf (1995). Tables 2, 3, and 4 display the existing vegetation type groups within the fire perimeters by fire by ownership.

Table 2 - Harris Fire - Acres of Vegetation Types by Agency				
Vegetation Community	Ownership			
	BIA	BLM	FWS	Other
Agriculture	0	1	0	2,539
Annual Grassland/Forbland	0	474	146	4,052
Disturbed	0	4	0	30
Mixed Conifer	0	9	0	40
Oak Woodland	0	69	0	658
Perennial Grassland	0	0	0	149
Open Water	0	0	0	11
Riparian	0	82	4	810
Southern California Coastal Scrub	0	6,629	2,448	26,765
Southern California Dry Mesic Chaparral	0	10,694	1,523	34,364
Southern California Oak Woodland and Savanna	0	252	15	1,064
Urban	0	2	1	119
TOTAL	0	18,216	4,137	70,601

Note: due to errors in rounding up numbers from the GIS database, total acres may not equal total given for final fire sizes.

Table 3 - Poomacha Fire - Acres of Vegetation Types by Ownership				
Vegetation Community	Ownership			
	BIA	BLM	FWS	Other
Agriculture	159	2	0	636
Annual Grassland/Forbland	765	1	0	1,218
Disturbed	52	0	0	10
Mixed Conifer	2,728	83	0	4,835
Oak Woodland	3,162	346	0	5,258
Perennial Grassland	5	0	0	130
Open Water	0	0	0	0
Riparian	667	56	0	915
Southern California Coastal Scrub	2,418	69	0	1,556
Southern California Dry Mesic Chaparral	8,209	1,430	0	7,906
Southern California Oak Woodland and Savanna	3,111	697	0	3,163
Urban	21	0	0	20
TOTAL	21,297	2,684	0	25,647

Note: due to errors in rounding up numbers from the GIS database, total acres may not equal total given for final fire sizes.

Table 4 - Witch Fire - Acres of Vegetation Types by Ownership				
Vegetation Community	Ownership			
	BIA	BLM	FWS	Other
Agriculture	9	1	0	4,796
Annual Grassland/Forbland	337	11	0	11,720
Disturbed	1	25	0	155
Mixed Conifer	30	0	0	1,145
Oak Woodland	1,036	30	0	5,045
Perennial Grassland	1	0	0	394
Open Water	0	0	0	1,040
Riparian	382	8	0	3,286
Southern California Coastal Scrub	1,705	94	0	25,656
Southern California Dry Mesic Chaparral	5,791	821	0	82,960
Southern California Oak Woodland and Savanna	1,008	77	0	12,874
Urban	3	0	0	3,107
TOTAL	10,303	1,067	0	152,178

Note: due to errors in rounding up numbers from the GIS database, total acres may not equal total given for final fire sizes.

This section describes the vegetation types and their respective plant alliances or communities which occur across the three fires. It also describes their typical response to wildfire and is important to understanding the BAER Teams findings and recommendations regarding post-fire vegetation recovery.

Southern California Dry Mesic Chaparral

Chaparral is a highly variable plant community that occurs throughout the burned areas. Chaparral communities found in the burned areas include Chamise Chaparral, Mixed Chaparral, Montane Chaparral, and Scrub Oak Chaparral. Chaparral occurs throughout the coastal lowlands, foothills, and montane region. Chaparral typically forms a dense, almost impenetrable shrub community with no herbaceous layer. This vegetation type ranges from sea level to about 4,440 feet. (Natureserve 2004; Keeley 2006).

Mature chamise chaparral communities can reach a height of 3 to 9 feet tall and are overwhelmingly dominated by chamise (*Adenostoma fasciculatum*) with a variety of facultative seeders, including chaparral whitethorn (*Ceanothus leucodermis*), Eastwood's manzanita (*Arctostaphylos glandulosa*), yerba santa (*Eriodictyon* spp.), and flannel bush (*Fremontodendron californicum*). Mature chamise chaparral has no understory component and typically occurs on xeric or south facing slopes. These monotypic stands are often juxtaposed with diverse north-facing slopes of obligate resprouters such as scrub oak (*Quercus berberidifolia*), California coffeeberry (*Rhamnus californica*), and hollyleaf cherry (*Prunus ilicifolia*), sometimes separated

by ridge tops dominated by the obligate seeder hoaryleaf ceanothus (*Ceanothus crassifolius*). (Natureserve 2004).

Mixed Chaparral is typically divided into Northern Mixed Chaparral and Southern Mixed Chaparral. Mixed Chaparral is typically dominated by scrub oak, chamise, manzanita, and California lilac (*Ceanothus* spp.). Northern Mixed Chaparral is typically a dense, nearly impenetrable stand occurring on dry, rocky areas with little soil. Mixed Northern Chaparral can occur on north facing slopes in southern California. Southern Mixed Chaparral is not as tall or thick, with patches of bare soil, and is often intermixed with sage scrub communities. (Natureserve 2004).

Scrub Oak Chaparral is a dense evergreen chaparral type that can grow up to 20 feet tall and is dominated by scrub oak and birch-leaved mountain mahogany (*Cercocarpus betuloides*). Scrub Oak Chaparral typically occurs on more mesic sites than other chaparral communities, and often at higher elevations. (Natureserve 2004).

Minnich (1995) and Zedler (1995) give the fire return interval (FRI) for chaparral communities at 50 to 75 years but fires can occur every two to three decades. Keeley (personal communication, 2007) suggests a 70 year FRI with a range of 20 to 50 years. Large fires often result in homogenous stands of chaparral that develop and become fire prone as a large stand, which may burn again as a large fire. After a fire, chaparral species can either resprout or germinate from heat/leachate-stratified seed in a highly variable mosaic. For a few years after a fire, annual forbs germinate and establish on site until the woody shrubs mature. Frequent fires and hot fires can burn the root system and surface seed bank resulting in loss of diversity and low-density vegetative communities.

Southern California Coastal Scrub

The Southern California Coastal Scrub consists of low, woody semi-deciduous shrubs that occurs below 2,500 feet and dominates the lower elevations along the coast and in interior valleys. These communities are dominated by California sagebrush (*Artemisia californica*), black sage (*Salvia mellifera*), California brittlebush (*Encelia californica*), saw-toothed goldenbush (*Hazardia squarrosa*), and coastal buckwheat (*Eriogonum cinereum*). The understory supports a variety of herbaceous annuals and several varieties of native and non-native grasses. Much of the coastal sage scrub has been reduced in the area due to development, and approximately 15 percent of its former range is extant. Some of the post-fire flora is equally common in the dry mesic chaparral community type. These species include flat top buckwheat (*Eriogonum fasciculatum*), chaparral mallow (*Malacothamnus fasciculatus*), sugarbush (*Rhus ovata*), and laurel sumac (*Malosma laurina*). The Southern California Coastal Scrub can be divided into the coastal sage scrub and the interior sage scrub; coastal being on the mesic end and the interior version on the arid end of the soil moisture gradient. (Natureserve 2004).

Most of these species are fire adapted and quickly regenerate from seed or resprouts after a fire. However, frequent fires (less than ten years apart) in an area can reduce the seed bank for native shrub species and increase the presence of non-native grasses and forbs resulting in habitat fragmentation. This vegetation community burns easily and can reburn in two to three years after a recent fire, primarily due to increased human ignitions, Santa Ana winds in the autumn and invasion by invasive grasses. On the more arid end of the soil moisture gradient, less disturbance is needed to replace woody and semi-woody vegetation with herbaceous species (Keeley 2006).

When degraded habitat burns, the coastal sage scrub can be converted to non-native grasslands dominated by mustards and bromes. Once this habitat conversion occurs, coastal sage scrub species typically do not re-colonize the area due to competition from dense populations of invasive grasses that increase the fire frequency and interfere with seedling survival of obligate seeders.

Annual Grassland/Forblands and Perennial Grasslands

Perennial Grasslands are a minor component of the burned areas, comprising only a total of 673 acres based on the mapping data available to the BAER Team. The tussock forming purple needlegrass (*Nassella pulchra*) typically occurs on fine textured clay soils and is associated with a variety of native forbs including species of *Calochortus*, *Dichelostemma*, rancher's fireweed (*Amsinckia mezesii* var. *intermedia*), and adobe popcorn-flower (*Plagiobothrys acanthocarpus*). The native bunchgrasses foothill needlegrass (*Nassella lepida*) and coast range melic (*Melica imperfecta*) are associated with purple needlegrass. The perennial grasslands often include a variety of non-native grasses including slender wild oats (*Avena barbata*), ripgut brome (*Bromus diandrus*), and red brome (*B. matritensis*). (Natureserve 2004).

Fine textured, poorly drained, alkaline soils are dominated by native species sacaton (*Sporobolus airoides*) or saltgrass (*Distichlis spicata*). This community typically occurs in areas with a high seasonal water table and is often associated with Alkali Seeps and Alkali Meadows.

Non-native grasslands can be dense to sparsely covered communities dominated by non-native grasses such as red brome, ripgut brome and softchess brome; and can include a variety of native forbs that occur with purple needlegrass. Non-native grasslands germinate during early winter rains and complete their life cycle by spring, then dry up during summer and fall. Non-native grasslands often intergrade with open oak woodlands and disturbed California Coastal Scrub communities.

Grassland communities in San Diego County have evolved with, and are typically maintained by, fire. Fire effects to perennial grasslands include reduced thatch and increased forb diversity. Fire can reduce the cover of both native and non-native grasses, opening space for germination and establishment of native forb species. Fire in non-native grasslands maintains dominance by invasive grasses and prevents establishment by native shrub species.

Southern California Oak Woodland and Savanna and Oak Woodlands

These oak woodlands and savannas occur in coastal plains and intermountain valleys from Ventura County, California, south into Baja California, Mexico. Coast live oak, (*Quercus agrifolia*), Interior live oak (*Quercus wislizeni*), Englemann oak (*Quercus engelmannii*), and/or California black walnut (*Juglans californica*) dominate a mixed closed or open canopy. Southern chaparral species such as chamise, lemonade berry (*Rhus integrifolia*), sugarbush, *Ceanothus* spp., *Ribes* spp., and manzanita species are also characteristic. Variable canopy densities in existing occurrences are likely due to variation in soil moisture regime, natural patch dynamics of fire, and land use (fire suppression, livestock grazing, herbivory, etc.). Most of these woodlands and savannas have been heavily altered through urban and agricultural development throughout southern California. (Natureserve 2004).

There is a subtle difference between the oak woodlands and the Southern California oak woodland and savanna. There is more of a mix of chaparral, dense stands of Englemann oak and stands with different species of oak in the Southern California savanna and the oak woodlands can have a dominant species (ie coast live oak) as the primary overstory with grasses as the understory.

Fire return intervals occur one to several times a century. On more mesic sites fire frequency is reduced and fire effects results in patches of crown fire and surface fire with unburned patches. On xeric sites open woodlands support an understory of annual grasses which increase fire frequency.

Riparian

The riparian vegetation type includes a number of communities including wetlands, freshwater marshes, and various woodlands and shrublands. Riparian woodland communities in the burn areas include Mulefat Scrub, Southern Willow Scrub, Southern Cottonwood-Willow Riparian Forest, Southern Coast Live Oak Riparian Forest, Southern Sycamore-Alder Riparian Forest, and White Alder Riparian Forest. Although most fires burn as crown fires with high intensity, fire

severity is generally low due to the predominance of vigorous sprouting species. Woody species in scrub and forested wetlands may recover from fire by epicormic sprouting from stems or basal sprouting from the roots. (Natureserve 2004).

Wet meadows and wetlands typically do not burn since the moisture content in the plants and soils retard fire advance. Many wetland species are rhizomatous and will likely survive fires. During drought times and in dry meadows fire will quickly burn through these communities. Fall fires typically have little impact on local meadows since most plants are dry and have dispersed their seed. These wetlands include Alkali Seep, Freshwater Seep and Freshwater Marsh. Wet meadows discussed above are often defined as wetlands.

Riparian communities vary depending on the aquatic system they are associated with and can have seral stages of community succession. Mulefat Scrub and Southern Willow Scrub are typically early seral stages for Southern Cottonwood-Willow Riparian Forest, which develops into Southern Coast Live Oak Riparian Forest. In steep drainages, Mulefat Scrub and Southern Willow Scrub may be early stages for Southern Sycamore-Alder Riparian Forest or White Alder Riparian Forest. Dominant species are Fremont cottonwood (*Populus fremontii*), western sycamore (*Platanus racemosa*), willows (*Salix* spp.), mulefat (*Baccharis salicifolia*).

The Southern Coast Live Oak Riparian Forest (found on the La Jolla Reservation) is an open to dense evergreen riparian woodland that occurs on moist to saturated alluvial soils adjacent to ponds or streams. The Southern Coast Live Oak Riparian Forest is dominated by coast live oak (*Quercus agrifolia*) with white alder (*Alnus rhombifolia*) and a variety of willows. The understory includes western ragweed (*Ambrosia psilostachya*), poison oak (*Toxicodendron diversilobum*), mugwort (*Artemisia douglasiana*), and a variety of herbaceous forbs and grasses.

Riparian communities are typically impacted by flood events where late seral stages are set back to Mulefat Scrub or Southern Willow Scrub. Flooding will destroy extant riparian communities and may deposit alluvium over root systems or wash away entire vegetated terraces. Riparian communities often resist fire since riparian species do not experience drought. During drought, riparian species become more susceptible to fire. Stand destroying fires can assimilate flooding events in that they set communities back to early seral stages. Stump sprouting species, like oaks, can reestablish in the early successional communities. Most mature trees that experience high intensity fires will die.

Mixed Conifer and Oak Woodlands

See write up on community descriptions under Pauma forest reserve, below. The habitat of bigcone Douglas fir (*Pseudotsuga macrocarpa*), is often associated with chaparral and oak woodlands. Bigcone Douglas fir is one of three conifers in California that sprout. Unlike Pacific yew and coast redwood, bigcone Douglas fir sprouts from epicormic buds throughout the length of the bole and branches. Trees less than about 6 inches dbh fail to resprout. Sprouting success may be dependent on fire severity not on tree size (Keeley 2006; Minnich 1980). Seedling recruitment occurs sporadically under fire free periods and is favored on north facing more mesic slopes. To achieve a mature stand 50 to 100 years of fire-free conditions are required. Frequent fires favor mature trees and infrequent fires favor expansion.

Southern Interior Cypress Forest

This vegetation community consists of dense stands of Tecate cypress (*Cupressus forbesii*) which occur on steep slopes of meta-volcanic or gabbro soils on mostly north facing aspects. It is found on Otay Mountain and the north side of Tecate Peak. This forest type is intermixed with chamise and montane chaparral; it can be considered a component of the dry mesic chaparral. Tecate cypress is fire-adapted species that has a fire regime like chaparral. The closed cone cypress forests (which also includes the species Cuyamaca cypress) has characteristics of a stand-replacing crown fire regime.

Tecate cypress is an obligate seeder; the serotinous cones open after fire and the seeds recruit heavily the first year after fire. Trees need to mature to at least 40 years (a range from 27 to 40 years) before producing sufficient seeds to recolonize a population burned in a stand replacing fire (Keeley, personal communication, 2007). Trees less than 27 years of age may not produce sufficient cones that are mature enough to produce viable seeds. Fire return intervals are thought to be over 100 years (Keeley 2006).

Agriculture

Plants that are commonly found in the agriculture lands use type includes: tree fruit orchards, vineyards, selected crops and crop stubble, and many of the grasses and herbs found in other vegetation types.

A minor community which is reported to be present in the Harris and Witch Fires, is the South Coastal California Vernal Pool. These systems are shallow ephemeral water bodies found in small depressions that range from Baja Norte, Mexico, north through Santa Barbara County, California. They are found from sea level to 7800 feet. These vernal pool systems are found on flat-topped marine terraces with Si-Fe cemented hardpans, volcanic bedrock, and acidic intrusive rock underlying thin soils. Characteristic plant species include *Trichostema austromontanum*, *Pogogyne abramsii*, *Eryngium aristulatum*, *Orcuttia californica*, *Pogogyne nudiuscula*, *Navarretia fossalis*, *Hemizonia parryi* ssp. *australis*, and *Lasthenia glabrata* ssp. *coulteri*. The majority of the plants found in this pool system are sensitive species. Olay mesa mint (*Pogogyne nudiuscula*) is reported to be on FWS lands within the fire.

Table 5 lists the fire response and recruitment mechanisms of common species found in the vegetation community types described in this assessment. Some of Table 2 is adapted from Hilbert 1987 and Keeley 1991.

Table 5 Fire response for selected species

Species	Fire response/ Revegetation Mechanism	Fire Effects/Susceptibility to Damage
Coastal sagebrush (<i>Artemisia californica</i>)	Facultative seeder ^b ; young stems sprout	Top killed or killed; stimulated by fire. Polymorphic seeds survive fire.
California brittlebush (<i>Encelia californica</i>)	Obligate resprouters; basal sprouts in absence of fire	Top killed
Coastal buckwheat (<i>Eriogonum cinereum</i>)	Obligate resprouter; basal sprouts in absence of fire	Top killed or killed
Bush mallow (<i>Malacothamnus fasciculatus</i>)	Seed ^a	Killed; stimulated by fire
Flat topped buckwheat (<i>Eriogonum fasciculatum</i>)	Sprouter or seeder; young stems sprout;	Top killed or killed; in dry mesic chaparral present as dormant seed banks
Deerweed (<i>Lotus scoparius</i>)	Obligate seeder ^a ; germination occurs on open sites without fire.	Killed. Massive seed crop post-fire
Sugarbush (<i>Rhus ovata</i>)	Sprouting or seed ^a	Top killed; fire stimulated

Species	Fire response/ Revegetation Mechanism	Fire Effects/Susceptibility to Damage
Laural sumac (<i>Malosma laurina</i>)	Seeder and resprouter	Top killed; fire stimulated with high seed recruitment
White sage (<i>Salvia apiana</i>)	Seed ^a	Top killed
California lilac, many species incl. woolyleaf (<i>Ceanothus tomentosus</i>)	Obligate seeder ^a	Killed. Short-lived
Chaparral whitethorn (<i>Ceanothus leucodermis</i>)	Facultative seeder	Top killed; recruits after fire primarily from seed
Chamise (<i>Adenostoma fasciculatum</i>)	Sprout/facultative seeder ^{a/b}	Top killed or killed
Eastwood's manzanita (<i>Arctostaphylos glandulosa</i>)	Facultative seeder/sprouter	Top killed or killed
Otay manzanita (<i>A. otayensis</i>)	Obligate seeder	Top killed or killed; no sprouting, frequent fire depletes seed bank
Flannel bush (<i>Fremontodendron californicum</i>)	Sprouter/facultative seeder ^b	Top killed
Mexican flannelbush * (<i>Fremontodendron mexicanum</i>)	Facultative sprouter/seed	Top killed
Poison oak (<i>Toxicodendron diversilobum</i>)	Seed ^b	Top killed
Yerba santa (<i>Eriodictyon crassifolium</i>)	Facultative seeder ^b	Top killed or killed
Scrub oaks (<i>Quercus berberidifolia</i> , <i>Q. dumosa</i>)	Obligate resprouter	Top killed; rarely killed. Seedlings sprout after fire
Toyon or Christmas berry (<i>Heteromeles arbutifolia</i>)	Obligate resprouter	Top killed; rarely killed. Seedlings sprout after fire.
Hollyleaf or chaparral cherry (<i>Prunus ilicifolia ilicifolia</i>)	Obligate resprouter	Top killed; rarely killed. Seedlings sprout after fire.
California Coffeeberry (<i>Rhamnus californica</i>)	Obligate resprouter	Top killed; rarely killed. Seedlings sprout after fire.

Species	Fire response/ Revegetation Mechanism	Fire Effects/Susceptibility to Damage
Tecate cypress (<i>Cupressus forbesii</i>)	Serotinous cones	Killed. Repeated fires with a FRI less than 27 years could be detrimental.
Bigcone Douglas fir (<i>Pseudotsuga macrocarpa</i>)	Epicormic sprouter	Top killed or survives. Sprouts from epicormic bud throughout bole and branches.

* Species listed under the Endangered Species Act

^a Heat stratification

^b Charate stratification—seed germination stimulated by chemicals in charred wood.

^c Note: plants that regenerate from seed may be stimulated to germinate by low severity fire, but may not regenerate following high severity fire, if the soil organic matter/ seed bank is destroyed.

Tree Hazards

The fires burned with varying severities in forested areas along roads and through neighborhoods. In many areas, vegetation density and topography allowed greater fire intensity in draws and drainages where generally trees were concentrated. In other cases, trees growing adjacent to homes and structures that burned were subjected to greater fire intensities.

BAER foresters examined Reservation, Bureau of Land Management and US Fish & Wildlife lands within the Harris, Poomacha and Witch fires for tree hazards and in some cases private lands when asked to by a Tribe. Tree hazards along highways and on other land ownerships were not examined and were expected to be identified and mitigated by fire, Caltrans, SDGE, FEMA and other crews.

The National Park Service Tree Hazard Rating System was used to identify imminent tree hazards. Trees that rated a four or greater were marked for immediate mitigation. The NPS Tree Hazard guidelines may be accessed from the NPS website www.nps.gov.

Native tree species in the area generally are adapted to fire. Informal examinations of trees that survived the 2003 fires and in discussions with local fire ecologists, show that most oak species will recover from all but the most severe fire intensities. Due to this, long-term tree hazards were not examined until after the onset of the next growing season when it could be determined which trees will not recover.

Pauma Forest Reserve

The Pauma Reservation has an area on the east side of the reservation northwest of Palomar Mountain that is designated as a Forest Reserve. Generally, the Forest Reserve includes all the slopes above the valley to the top of the mountain in and adjacent to Frey and Agua Fria creeks. The Pauma Forest Reserve includes the following coniferous forest communities:

Oak Woodland Forests typically occur in moist areas in canyons and along streams. At higher elevations, these forests occur across the broader landscape. This community develops a dense, arboreal canopy with limited understory shrubs or fuel accumulation. This type is typically an open to dense forest with scattered Coulter pine (*Pinus coulteri*) and black oak (*Quercus kelloggii*) with a typical upper Sonoran mixed chaparral shrub layer. Tree canopy can be dense enough to exclude the shrub component. This type occurs on dry rocky soils on slopes and ridges

intermixing with Mixed Chaparral and lower Montane Chaparral. Common associates include a variety of manzanita species, lilac species, birch leaved mountain mahogany, and live oaks.

Coulter pine, considered a low elevation pine, is found in chaparral to forest habitats. Fire regimes vary from stand-replacing to stand-thinning. When associated with chaparral, cones are serotinous and recruitment is synchronized to the immediate post-fire environment, whereas on forested sites cones are not serotinous and recruitment may occur between fires and consequently stands are uneven aged (Borchert 1985; Borchert et al. 2002; Keeley 2006).

Mixed Conifer Forests occurs on the highest peaks in San Diego County and includes a variety of conifer species including white fir (*Abies concolor*), Jeffrey pine (*Pinus jeffreyi*), and bigcone Douglas fir (*Pseudotsuga macrocarpa*) intermixed with canyon live oak or black oak. The shrub community includes a variety of current, lilac, and manzanita.

According to the Pauma Tribe Environmental Specialist, the Environmental Assessment is complete and has been approved. The new forest plan however, is incomplete and not approved by the Regional Director at this time and there appears that there is no current forest plan in place. Without a forest plan in place, potential emergency stabilization and rehabilitation measures are limited.

Invasive Species

Noxious weeds and non-native invasive species are present in the burn area. Noxious weeds are now recognized worldwide as posing threats to biological diversity—second only to direct habitat loss and fragmentation. Noxious weeds are known to alter ecosystem functions such as nutrient cycles, hydrology, and wildfire frequency; to outcompete and exclude native plants and animals; and to hybridize with native species. The presence and abundance of noxious weeds in an ecosystem are highly dynamic, subject to changes in the local environment. (Whitson, T.D., et al. 1992; Cal-IPC, 2007).

The California Invasive Plant Council (Cal-IPC) lists the most problematic invasive plant species in the State. Of the known populations of invasive species that occur in the burned areas, there are some that Cal-IPC has given a High rating to. They are giant reed (*Arundo donax*), cheat grass (*Bromus tectorum*), red brome (*B. madritensis* ssp. *rubens*), sweet fennel (*Foeniculum vulgare*), and tamarisk (*Tamarix ramosissima*). Plants that Cal-IPC rates as Moderate are fountain grass (*Pennisetum setaceum*), tree of heaven (*Ailanthus altissima*), black mustard (*Brassica nigra*), tocalote (*Centaurea melitensis*), slender wild oat (*Avena barbata*), wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), and Italian ryegrass (*Lolium multiflorum*). Plants with a Limited rating and that are a concern locally include filaree (*Erodium* ssp.), Peruvian pepper tree (*Schinus molle*), can be problematic in degraded areas.

Other noxious weeds or invasive species of concern that are potentially within the burned areas include iceplant (*Carpobrotus edulis*), pampas grass (*Cortaderia selloana*), artichoke thistle, (*Cynara cardunculus*), and perennial pepperweed (*Lepidium latifolium*).

Reducing effects from invasive plant species to listed species and their habitat within the burned areas was brought up as a concern by the FWS and BLM. In areas where the endangered Quino checkerspot butterfly occurs, the most direct threats are from the bromes, filaree, black mustard, tocalote, the wild oats, and Italian ryegrass. These species are also problematic in native grasslands and frequently burned shrub, woodland, and forest communities. Annual grasslands thrive on frequent fires due to copious seed production and high seed survival under low-intensity fires (Keeley 2006). Greater invasive plant dominance can increase landscape flammability, and greater fire frequency can increase vulnerability to invasion (Brooks and Pyke 2001.) All natural communities are susceptible to invasion by noxious weeds. When habitat type conversion occurs in upland communities, dominance by these species usually occurs. Within riparian and wetland communities, giant reed and tamarisk can be problematic.

Threatened & Endangered and Sensitive Plants

Lists of T & E plant species potentially affected by the fires or suppression activities were obtained on November 1, 2007 from U.S. Fish and Wildlife Service (FWS). The lists were reviewed and concurred with by USFWS, BIA and BLM agency representatives for accuracy and to determine which species may occur within the fire areas.

Table 6 lists Threatened and Endangered plant that occur within the Harris Fire. Only one plant, Mexican flannelbush, is found on federal lands. The other species are on adjacent private lands; there is the potential for occurrences on lands managed by the FWS and the BLM. Table 7 shows sensitive species that are managed by the Bureau of Land Management and Fish and Wildlife Service consistent with an interagency Multiple Species Conservation Plan (MSCP). These species are not federally listed, but are managed according to similar resource conservation protocols so as to not further jeopardize the species and to assist with species recovery. All the plants are BLM special status species and are managed so as not to result in their becoming listed.

Table 6 - Threatened & Endangered Plants Known within the Harris Fire		
Species	Global/State Status	Listing Status ¹
San Diego thornmint (<i>Acanthomintha ilicifolia</i>)	G1/S1.1	FT/SE
San Diego button-celery (<i>Eryngium aristulatum</i> var. <i>parishii</i>)	G5T2/S2.1	FE/SE
Willow monardella (<i>Monardella viminea</i>)	G2/S2.1	FE/SE
Mexican flannelbush (<i>Fremontodendron mexicanum</i>)	G2/S2.1	FE/SR
Otay Mesa mint (<i>Pogogyne nudiuscula</i>)	G1/S1.1	FE/SE
Otay tarplant (<i>Deinandra conjugens</i>)	G1/S1.1	FT/SE

¹ FT = federally threatened, FE = federally endangered, SE = state endangered, SR = state rare

Table 7 - Sensitive Plants Known within the 2003 Southern California Fires		
Species	Global/State Status ¹	Listing Status
Otay manzanita (<i>Arctostaphylos otayensis</i>)	G2/S2.1	Sensitive (MSCP& BLM)
Tecate cypress (<i>Cupressus forbesii</i>)	G2/S1.1	Sensitive (MSCP& BLM)
Variegated dudleya (<i>Dudleya variegata</i>)	G2/S2.2	Sensitive (MSCP& BLM)
San Diego barrel cactus (<i>Ferocactus viridescens</i>)	G4/S3.1	Sensitive (MSCP& BLM)
Gander's pitcher sage (<i>Lepechinia ganderi</i>)	G2/S2.2	Sensitive (MSCP& BLM)
Felt-leaved monardella (<i>Monardella hypoleuca</i> ssp. <i>lanata</i>)	G4T2/S2.2	Sensitive (MSCP& BLM)

San Diego goldenstar (<i>Muilla clevelandii</i>)	G2/S2.2	Sensitive (MSCP& BLM)
Orcutt's brodiaea (<i>Brodiaea orcuttii</i>)	G3/S3.1	BLM sensitive; CNPS - 1B.1

¹ California Natural Diversity Data Base ranks for threats and/or vulnerability:

G	Global rank indicator, based on worldwide distribution at the species level
T	Global trinomial rank indicator, based on worldwide distribution at the infraspecific level
S	State rank indicator, based on distribution within California at the lowest taxonomic level
1	Critically imperiled and especially vulnerable to extinction or extirpation due to extreme rarity, imminent threats, or other factors; less than 1,000 individuals
2	Imperiled due to rarity or other demonstrable factors; 1,000-3,000 individuals
3	Vulnerable to decline because rare and local throughout its range, or with very restricted range; 3,000-10,000 individuals
4	Long-term concern, though now apparently secure; usually rare in parts of its range, especially at its periphery
5	Population or stand secure due to being common in the world

Culturally Significant Species

Meetings with Tribal representatives resulted in the identification of plant species that are culturally significant. Plant lists were obtained for both the La Jolla and Rincon Reservations. The plants are:

Table 8 - Culturally Significant Plants on Tribal Lands			
Species	Global/State Status	Listing Status ¹	Habitat
Rainbow manzanita (<i>Arctostaphylos rainbowensis</i>)	G2/S2.1	F – none; CNPS – 1B.1	Riparian woodland in chaparral and oak woodland, coast live oak/sycamore associations
Orcutt's brodiaea (<i>Brodiaea orcuttii</i>)	G3/S3.1	F – none; CNPS -1B.1	Wetlands & riparian; vernal pools, meadows, closed cone forest (Tecate cypress); conifer forest
Engelmann oak (<i>Quercus engelmannii</i>)	N/A	N/A	Oak woodlands – Southern California oak woodland
<i>Juncus</i> spp.	N/A	N/A	Riparian areas

¹ federal or California Native Plant Society

B. Reconnaissance Methodology and Results

When the BAER team arrived, meetings were held with local agency staff to identify issues and determine the focus for conducting the resource assessment. Information on vegetation, sensitive plant species, invasive plants, possible seeding strategies, and other resources was obtained from specialists from BLM-PS-SCFO, FS-CNF, BIA-SCA, FWS and NRCS-EFO.

Identification and mapping of vegetation mortality was aided by using post-fire satellite image-derived reflectance classification. A Burned Area Reflectance Classification (BARC) is a satellite image-derived map of post-fire changes in spectral reflectance. This is used in combination with field observations to develop a map of post-fire vegetation top kill or above ground mortality. The

BAER Forester used the BARC map and imagery from Landsat 5 and 7 to create the final vegetation top kill map. The BARC map and satellite imagery was evaluated by field visits and helicopter reconnaissance, and classification break points were adjusted to produce the final vegetation mortality map.

Reconnaissance of impacted areas was conducted utilizing low level aerial survey and field visits. Ground surveys were undertaken to refine and calibrate aerial survey data, map and document vegetation losses and survival, and determine fire effects to vegetation and sensitive species. Ground reconnaissance included traversing affected areas, hiking to remote areas, and recording observations on plant community types, species composition, top-kill (previously called vegetation mortality) on vegetation, topographic features, noxious weed species, range improvements, and suppression damage. Ground survey observations were compared with data obtained from the BAER watershed and wildlife specialists to correlate burn with vegetation top kill. The vegetation specialist and foresters also visited recent burned areas adjacent to the Harris and Poomacha Fires to observe post-fire response from the years 1998, 2003, and 2005.

When conducting vegetation mortality mapping the vegetation specialists look at all the layers of vegetation—trees, shrubs, and herbaceous (forbs and grasses), then determined the immediate post-fire effects on vegetation, the top kill of vegetation. For shrubs such as chamise and manzanita (woody species), mortality was determined by how much of the top portion was removed—the stems, branches, leaders, flowering stalks. Specialists then looked at how much living material was left which is a factor of amount of leaves remaining, if the bark was burned off, and if moisture is still in the stems.

C. Findings

Vegetation Top-kill

The degree of fire-related top kill was determined by aerial and on-the-ground reconnaissance. Chaparral, woodlands and forests, grasslands and riparian areas within the burns were classified into four vegetative, above ground, top kill levels. A Vegetation Above Ground Kill map is found in Appendix IV.

Vegetation mortality was classified into the following four categories based on immediate post fire mortality of the above-soil plant parts:

Unburned to Low top kill (0-25%)
 Low to Moderate top kill (26-50%)
 Moderate to High top kill (51-75%)
 High top kill (76-100%)

For the purposes of this assessment, vegetation mortality refers to immediate post fire mortality of the above-soil plant parts. These classifications do not imply long term vegetation mortality or recovery potential. Resprouting and releafing from epicormic plant parts or root crowns can occur on many species based on specific plant physiological characteristics, degree of injury, climatic conditions, environmental stress such as drought, and the presence of other damaging agents, including animals and insects. Vegetation top kill, or above ground mortality classification parameters include degree of consumption of herbaceous, shrub, and forest/woodland vegetation communities, and effects of the fire on the regeneration potential of the affected vegetation species. Tables 9, 10, & 11 shows the immediate post-fire vegetation mortality by ownership, according to observations noted by BAER Team vegetation and forestry specialists.

Table 9 – Acres of Above Ground Vegetation Mortality by Agency
Harris Fire - Acres by Percent of Above Ground Vegetation Mortality by Ownership

Ownership	<25% Above Ground Mortality	26 - 50% Above Ground Mortality	51 - 75% Above Ground Mortality	>75% Above Ground Mortality	Total Acres
Bureau of Land Management	1,161	3,275	6,564	7,217	18,217
US Fish & Wildlife Service	73	336	1,169	2,559	4,137
Other	4,384	10,785	21,113	31,698	67,990
TOTAL	5,618	14,396	28,856	41,474	90,344

Note: due to errors in rounding up numbers from the GIS database, total acres may not equal total given for final fire sizes.

Table 10 – Acres of Above Ground Vegetation Mortality by Agency					
Poomacha Fire - Acres by Percent of Above Ground Vegetation Mortality by Ownership					
Ownership	<25% Above Ground Mortality	26 - 50% Above Ground Mortality	51 - 75% Above Ground Mortality	>75% Above Ground Mortality	Total Acres
BLM	1,245	430	316	692	2,683
FWS	0	0	0	0	0
BIA	2,838	3,937	4,417	10,106	21,297
Other	4,329	5,644	6,770	8,835	25,577
TOTAL	8,411	10,010	11,503	19,633	49,557

Note: due to errors in rounding up numbers from the GIS database, total acres may not equal total given for final fire sizes.

Table 11 – Acres of Above Ground Vegetation Mortality by Agency					
Witch Fire - Acres by Percent of Above Ground Vegetation Mortality by Ownership					

Ownership	<25% Above Ground Mortality	26 - 50% Above Ground Mortality	51 - 75% Above Ground Mortality	>75% Above Ground Mortality	Total Acres
BLM	120	155	378	412	1,065
FWS	0	0	0	0	0
BIA	538	977	3,331	5,452	10,298
Other	10,307	14,431	49,936	77,073	151,747
TOTAL	10,966	15,564	53,645	82,937	163,111

Note: due to errors in rounding up numbers from the GIS database, total acres may not equal total given for final fire sizes.

Assessments were conducted on DOI administered lands and the discussion on above ground vegetation mortality (top kill) and vegetation recovery refer to primarily those federally administered lands. The vegetation specialists did consider fire effects on private lands and lands administered by other jurisdictions and where those burned areas had potential to influence recruitment, they were considered in this assessment.

Slopes with north to west to south aspects burned hotter (had more residency time) on the Poomacha and Witch Fires than on the Harris Fire, on DOI administered lands. This was observed on coastal sage scrub, Southern California dry mesic chaparral, and oak woodlands/oak woodland savannas.

Grasslands (annual grass/forbland and perennial grassland)

Grasslands will regenerate quickly from existing seed sources or from seed transported by the wind. Invasive, non-indigenous species are most likely to increase on this type and will need to be monitored for expansion into perennial grasslands, coastal sage scrub and xeric mixed chaparral vegetation types that have burned within the last 20 years, and oak woodlands that had an annual grass understory pre-fire . All grasses and forbs will take advantage of an increase in sunlight and water.

Urban/Agriculture/Disturbed

Most vegetation burned on the agriculture type will be replaced with alien grasses and forbs until shrubs slowly invade from the edge of fields, or orchards are re-planted. Invasion by brush would be slow in plowed fields. There was very little vegetation on the urban or disturbed except for ornamental plants. These sites will either be re-planted or become revegetated with colonizers from outside.

Southern California Coastal Scrub and Southern California Dry Mesic Chaparral

In the chaparral and coastal sage-scrub types, most surface vegetation has been killed and consumed by the fire. On those slopes where most or all the vegetation has been removed, the residency time of the flames was short due to the fast moving, wind driven fire. In this case many of the epicormic roots and below ground parts were little damaged or the seed bank was not totally consumed. In these areas, plants will return quickly from stored seed in the soil that was scarified by the fire or stimulated by smoke. In addition obligate resprouters will regenerate, especially on mesic or north facing slopes. Although top kill in chaparral communities was above 51% in some areas (86 % on Harris, 62% on Poomacha, and 86% on the Witch Fire), there was little residency time for heat and landscapes were in a mosaic of unburned to high.

Chamise chaparral – This community is composed of low-density shrubs on xeric slopes. Chamise is the dominant shrub type. This indicates sufficient live seed banks and rootstocks for regeneration and recruitment. Depending on the site and aspect, chamise will regenerate by resprouting from the root crown or from seed.

Coastal Sage-Chaparral Scrub - This community is composed of low-density shrubs growing on either coastal influenced mesic conditions or interior xeric conditions. Dominant shrubs are mixed. Soil burn severity is generally low to moderate and soil organic matter has not been totally consumed by fire, indicating sufficient live seed banks and rootstocks. Chamise will regenerate by sprouting from the root crown. Sage species will regenerate from seed where soil seed banks remain viable. Perennial grasses will sprout from live rootstocks and regenerate from seed. Some of the burned areas have been subjected to frequent fires and annual grass invasion. In addition urban development has fragmented these same communities. There will be a high potential for exotic annual plant species to prevent obligate seeders from re-colonizing these sites. This situation was found on lands administered by FWS and BLM.

Mixed Chaparral and communities not dominated by chamise - These communities are composed of high-density shrubs dominated by manzanita species, chamise, California lilac, chaparral whitethorn, and scrub oaks. As mentioned above, most of the chaparral communities had experienced greater than 50% top kill. At the landscape level these communities burned in a mosaic and where there was total consumption only the immediate surface organic layer burned. Post-fire response will likely be mixed according to local shrub species composition and burn patterns. Shrubs that regenerate by sprouting will likely re-sprout, even within the high severity burned areas. The watershed group noticed that sugarbush was already sprouting 10 to 12 after the fires were contained.

The vegetation specialists examined post-fire response in these community types on the adjacent Paradise, Otay, and Border Fires, that burned in 2003, 2003 and 2005 respectively. On Otay mountain scrub oak and Eastwood's manzanita exhibited strong sprouting response. Otay manzanita, an obligate seeder was 1 to 3 feet tall. Obligate seeders may be removed from locations that experienced high burn severity, especially on more xeric sites.

Montane Chaparral – This community is similar to the mixed chaparral type, but occupies more mesic sites. Response will be similar to the mixed chaparral type. Localized areas that burned at high severity may re-vegetate slowly if the dominant shrub species do not regenerate by sprouting. Areas near Palomar Mountain burned in a mosaic and many of those oak and manzanita species had unburned plants next to individuals that were totally consumed by fire. Recruitment from seeds should occur in this plant association.

Scrub Oak Chaparral - This community is similar to the mixed chaparral type, but occupies higher elevation more mesic sites. Response will be similar to the montane chaparral type, but more rapid due to the dominance of scrub oak, which sprouts vigorously following both high and low severity burns.

Riparian

There is scant published literature on fire effects in local riparian communities. Based upon observations from Black Canyon, Sycamore Canyon, Tijuana River, riparian communities near Witch Creek (Highway 78) and San Luis Rey River on the La Jolla Reservation the majority of riparian trees, shrubs and herbaceous plant will recover. Fire seldom results in mortality of riparian roots, forbs, tubers, bulbs and other below-soil plant parts due to soil moisture protection from heat. Burned riparian sedges that occur in 8 inch diameter tufts, were observed to be greening up along the Cottonwood River (Black Canyon) and along the Tijuana River. It is presumed that most non-woody riparian vegetation will re-sprout rapidly post-fire.

Some riparian hardwood species such as Fremont cottonwood cannot tolerate fire damage to the cambium. All cottonwood trees with greater than 25% cambium mortality will likely die. Individuals in Cottonwood Canyon had a mosaic of killed trees and those untouched by fire. Surviving wounded trees will likely succumb in the near future due to the introduction of stem diseases. Sycamore and alder trees have thin bark and are readily top-killed by fire. Both species will re-sprout from the root crown following top-kill. However, shallow roots are a contributing factor to mortality in sycamore.

Numerous factors influence post-fire tree mortality, including: species characteristics, season the damage occurred, pre-fire tree vigor/site quality, extent of crown damage, extent of cambium damage, post-fire stand density/competition, post-fire climatic conditions, and insect/disease damage.

Live Oak Woodland Types: Most of these communities burned with a low or moderate top kill. Most of the coast live oak on slopes had little top kill but stands along riparian areas had more scorching and burning of leaves. Post-fire oak survival is related to fire intensity/duration, pre-fire vigor, and extent of crown/cambial damage (Plumb 1980). Susceptibility to top-kill is generally related to bark thickness (Plumb and Gomez 1983).

Stands of Englemann's oak on flat and sloping ridge tops on the Poomacha Fire (east of Rincon and on the Pauma Forest Reserve) were mostly consumed by the fire. Although this species is more fire resistant to fire than coast live oak due to a thicker bark (Keeley, 2006), mature stands in or adjacent to chaparral and scrub oak communities may produce lethal fires. This was observed during aerial surveys. The north facing slopes on the La Jolla Reservation and the west facing slopes with ridge tops and north facing aspects on the Rincon Reservation should be monitored for vegetation recovery (management non-specification recommendation). Almost all oak species sprout after fire, if root crown or under-ground portions are still alive (Plumb 1980, FEIS, 2007).

Montane Conifer types: Some conifer species, such as Jeffrey pine and incense cedar (on the Pauma Reservation and on Palomar Mountain), are highly adapted to frequent low/moderate intensity fires. Coulter pine takes advantage of fire to enhance delayed seed dispersal from mature cones, which are serotinous. And some, such as Tecate cypress, have serotinous (delayed opening) cones that are totally dependent upon fire for cone opening/seed release. In latter case, the parent tree is almost always killed by crown fire.

Table 12 – Vegetation top kill (above ground mortality) Harris Fire

Vegetation Communities	0-25 Percent	26-51 Percent	51-75 Percent	76-100 Percent	Total
Agriculture	5	5	11	34	55
Annual Grassland/Forbland	653	1,532	1,656	832	4,673
Disturbed	7	8	9	10	34

Mixed Conifer	1	0	1	45	47
Oak Woodland	11	14	36	666	727
Open Water	4	1	1	5	11
Perennial Grassland	2	10	9	6	27
Riparian	54	48	139	654	895
Southern California Coastal Scrub	2,768	7,446	13,641	11,988	35,843
Southern California Dry Mesic Chaparral	2,047	5,252	13,162	26,120	46,581
Southern California Oak Woodland and Savanna	34	59	159	1,079	1,331
Urban	32	22	31	36	121
Grand Total	5,618	14,397	28,855	41,475	90,345

Table 13 – Vegetation top kill (above ground mortality) Poomacha Fire					
Vegetation Communities	0-25 Percent	26-50 Percent	51-75 Percent	76-100 Percent	Total
Agriculture	274	207	147	162	790
Annual Grassland/Forbland	688	474	483	336	1,981
Disturbed	28	14	7	14	63
Mixed Conifer	793	1,397	1,690	3,767	7,647
Oak Woodland	928	1,887	2,562	3,389	8,766
Perennial Grassland	5	1	2	3	11
Riparian	145	346	438	709	1,638
Southern California Coastal Scrub	1,210	1,328	703	802	4,043
Southern California Dry Mesic Chaparral	3,384	3,275	3,758	7,125	17,542
Southern California Oak Woodland and Savanna	937	1,071	1,708	3,322	7,038
Urban	21	10	6	4	41
Grand Total	8,413	10,010	11,504	19,633	49,560

Table 14 – Vegetation top kill (above ground mortality) Witch Fire					
Vegetation	0-25 Percent	26-50 Percent	51-75 Percent	76-100 Percent	Total
Agriculture	389	214	709	3,083	4,395
Annual Grass Land/Forbland	1,253	2,313	5,987	2,482	12,035
Disturbed	53	43	66	15	177
Mixed Conifer	23	35	140	977	1,175
Oak Woodland	185	215	930	4,781	6,111
Open Water	676	52	75	55	858
Perennial Grassland	48	37	90	95	270
Riparian	233	179	579	2,684	3,675
Southern California Coastal Scrub	1,967	3,367	10,452	11,610	27,396
Southern California Dry Mesic	4,538	8,168	30,954	45,851	89,511

Chaparral					
Southern California Oak Woodland and Savanna	493	590	2,796	10,110	13,989
Urban	690	350	867	1,195	3,102
Grand Total	10,548	15,563	53,645	82,938	162,694

Threatened & Endangered and Sensitive Plants

Occupied habitat of Mexican flannelbush and Tecate cypress in Cedar Canyon was visited by the vegetation specialist and a FWS Biologist. The fire effects of the 2003 Otay Fire and the 2007 Harris Fire were observed. Although the fire burned very quickly through the canyon, the Harris fire burned Tecate cypress seedlings that had recruited from 2003. These trees were probably killed. Thousands of unburned seedlings were seen on the slopes above dead mature cypress trees.

Of the Mexican flannelbush plants visited approximately 10% appeared to be negatively affected by the fire. This tall shrub (small tree) does sprout and should recolonize the area; viable seeds were also observed in the seed pods. There was light scorching on the stems of flannelbush. The flannelbush will be impacted, however, by salt cedar (tamarisk), as there are hundreds of seedling and sapling tamarisk plants growing throughout Cedar Canyon.

Invasive Species

Non-native invasive plants and listed noxious weeds are present in the burned areas of the Harris, Poomacha, and Witch Fires. The vegetation specialists located known pre-fire locations of noxious weeds and found new populations of noxious weeds. The existing locations of noxious weeds were impacted by the fire and all are known to spread after fire. Weeds and non-native invasives located in burned areas include tocalote, fennel, tamarisk, red brome, cheat grass, and filaree. Recommendations were made to treat weeds in threatened & endangered plant habitat and to conduct assessments to determine the invasibility of burned populations of noxious weeds.

Most noxious weeds are favored by fire and all the weeds in the burned area are expected to spread beyond their current locations. Burned areas contain high nutrient levels, exposed ground surfaces and reduced shade. These conditions favor weed colonization and exponential weed growth, which can prevent reestablishment of desired vegetation and displace already established native plants (Goodwin, K & Sheley, R. 2001). The burned areas are now considered to have increased invasibility and combined with the invasiveness of the weeds present in the burned area, there is a high potential for weed spread.

Tree Hazards

More so than other tree species in the area, oaks are highly susceptible to becoming imminent tree hazards by fire. Damage from previous fires or rot entering broken branch stubs created areas where embers could land. In many cases a chimney effect was created where the fire was able to burn through the center of the bole and exit through a knot hole. These trees are highly susceptible to collapse with little exterior evidence of damage due to much of the interior support wood being consumed.

On the La Jolla Reservation, 31 imminent tree hazards were identified by BAER foresters and a number of others identified by fire crews and professional tree fallers. All have been mitigated.

On the Rincon Reservation, 3 imminent tree hazards were identified for felling.

On US Fish & Wildlife lands, approximately 8 tree hazards – all are eucalyptus - were identified on the San Miguel Mountain road in the Harris fire and a specification was written to have them mitigated.

No tree hazards were identified on BLM lands, or other reservation lands other than those discussed above.

Pauma Forest Reserve

On the upper end of the reserve where slopes are less than 40%, the fire burned in a mosaic pattern. The fire was hotter in areas where manzanita and other brush species are denser and the fire burned with less severity in areas where brush was not quite so dense due to previous fuels reduction treatments.

To the west, on slopes greater than 40%, brush, oaks and big cone Douglas-fir are the primary species. Fire burned in a heavy mosaic pattern in this type due to fuels and the steep slopes. The oaks and big cone Douglas-fir are primarily in the drainage bottoms and should survive the fire.

Due to the forest plan not being completed, insufficient trees of commercial size being killed and the lack of a market, potential salvage was not examined in detail. Reforestation also was not examined in detail as there are more than adequate surviving conifer species to naturally regenerate any opening created by the fire.

IV. RECOMMENDATIONS

A Emergency Stabilization

Bureau of Indian Affairs:

Specification # 10 Tree Hazard Identification – Identify tree hazards along tribally used roads and adjacent to residences within the La Jolla Reservation and Cuca neighborhood. A survey should be conducted by a silviculturist or forester experienced in tree hazard identification in late spring 2008 to identify tree hazards along roads and in neighborhoods on the La Jolla Reservation. Trees or major limbs of tree that have not flushed with new growth should be identified and flagged for removal as these trees that have been killed by fire will decay and will become high priority tree hazards. Trees or major branches of trees that have not survived the impacts of fire, but are structurally sound will, through time, decay and become a danger to the public. Fast growing species such as cottonwoods or willows will become hazards sooner than slower growing species such as oaks and sycamores.

Specification # 11 Tree Hazard Mitigation – Mitigate tree hazards along tribally used roads within the La Jolla Reservation and Cuca neighborhood. The trees identified in the above specification should be felled, limbed and buck to firewood lengths as soon as practicable after identification to minimize any potential threat to the safety of the public. In some cases a professional faller/tree trimmer may be required to fell hazard trees to avoid further damage to structures. Slash should be pile for removal or burning.

Specification # 6 Invasive Species Assessment – After the spring green-up, assess for noxious weeds/non-native invasive plant species on reservation lands burned within the perimeters of the Poomacha and Witch Fires. Sites for detection will be previously known locations, roadways, hand lines, dozer lines, retardant drops, and other disturbed areas. Inventory all known sites with high probability of an increase in invasive species populations. These high probability sites include those areas disturbed by hand or dozer line, increased road use and other disturbed areas. Approximately 30,361 acres will be assessed.

Specification # 9 Protective Fence - Re-construct and repair boundary fencing on the La Jolla, Rincon and Mesa Grande Reservations destroyed by the Poomacha and Witch Fires to prevent livestock and buffalo from wandering along and upon major road systems, creating a significant public safety issue. The 5.63 miles of fence to be re-constructed and the .27 miles to be repaired

will be at the same sites where previously located. Burned fence materials will be removed from the site before re-construction begins.

Specification # 8 Invasive Weeds Treatments - Control the spread of known noxious weed infestations on Lajolla and Rincon Reservation lands within the Poomacha Fire, prior to seed set and maturation. Treatment of these California listed noxious weeds is proposed since the likelihood of their movement into non-infested areas of the burn has been aggravated by the fire. Utilize integrated pest management techniques (chemical, biological, mechanical, and cultural control methods) as appropriate to prevent the spread and establishment of noxious weeds within the fire area. Grubbing may occur in riparian areas in limited situations.

Bureau of Land Management:

Specification # 5 Critical Habitat Seeding - Seed approximately 300 acres out of 1,150 acres of designated critical habitat for the federally endangered Quino checkerspot butterfly (QCB) on BLM lands within the Harris fire. This treatment is intended to prevent permanent impairment of designated critical habitat (BAER E.S. Handbook, Section 4.1.7) by reintroducing native species that are either larval host or nectar-producing species. To maximize probability of success, seeding should occur in early spring of 2008.

Specification # 6 Invasive Species Assessment – After the spring green-up, assess all known sites with high probability of an increase in invasive species populations. These high probability sites include those areas disturbed by hand or dozer line, increased road use and other disturbed areas. Approximately 22,000 acres will be assessed on BLM lands within the perimeters of the Harris, Poomacha and Witch Fires.

Specification # 7 Invasive Weeds Treatment - Control the spread of known non-native weed infestations on BLM lands within the Harris Fire, prior to seed set and maturation. Treatment of Tamarisk and Tocalote is proposed since the likelihood of their movement into non-infested areas of the burn has been aggravated by the fire. These treatments total approximately 560 acres. An additional 300 acres of Quino checkerspot butterfly habitat will be sprayed prior to seeding of the site.

Specification # 8 Protective Fence - Construct new permanent fences or repair existing fences to protect recovery of known habitat for the Quino Checkerspot butterfly, a listed T&E species, and prevent access to recovering areas by Off Highway Vehicles (OHV's). The 2.03 miles of fence are necessary to insure public safety for travelers along or within public lands.

Specification # 9 Seeding Effectiveness Monitoring – Monitor the effectiveness of seeding to stabilize Quino checkerspot butterfly designated Critical Habitat. Monitoring actions to stabilize designated Critical Habitat is needed to determine if treatment objectives were met and if further recovery actions are needed. Approximately 300 acres are proposed for monitoring.

Specification # 10 Treatment Effectiveness Monitoring – Invasive species control treatment will be monitored for one year to ascertain the success of invasive species control efforts on approximately 608 acres of BLM lands within the perimeter of the Harris Fire including Quino checkerspot butterfly critical habitat.

U.S. Fish & Wildlife Service:

Specification # 8 Tree Hazard Mitigation – Mitigate tree hazards identified on the San Miguel Mountain Road, within the San Diego National Wildlife Refuge. The imminent tree hazards identified on the San Miguel Mountain road should be felled, limbed and bucked as soon as practicable to minimize any potential threats to the safety of the public. Approximately 8 trees have been designated for mitigation.

Specification # 3 Invasive Weed Treatment – Selectively treat exotic plants with 2 % glyphosate solution applied with backpack sprayers. Control spread of non-native invasive species on approximately 3,023 acres of Fish & Wildlife lands, specifically the San Diego National Wildlife Refuge, using herbicides to protect the ecological integrity and productivity of designated critical habitat supporting 3 federally listed animal species and at least one listed plant species.

Specification # 5 Seed Critical Habitat CGN – Collect seed of *Artemisia californica*, *Eriogonum fasciculatum*, *Salvia munzii*, *Salvia apiana*, *Viguiera laciniata*, *Nassella pulchra*, *Muhlenbergia rigens*, *Rhamnus crocea*, *Plantago erecta*, and other native coastal sage scrub species as appropriate, from area surrounding burned site for use in seeding 3,023 acres of Coastal California Gnatcatcher habitat. Distribution (by broadcast seeding, hand or mechanical) of collected seed in burned areas, as appropriate.

Specification # 6 Seeding Critical Habitat QCB - Collect seed of Quino checkerspot butterfly larval host plants (*Plantago erecta*, *Castilleja exserta*, *Antirrhinum coulterianum*, *Lasthenia californica*, *Dichelostemma capitatum*, *Plagiobothrys* sp., *Cryptantha* sp., *Linanthus dianthiflorus*, *Lupinus bicolor*, *Mirabilis californica*, *Amsinckia* sp., *Phacelia* sp., *Allium* sp.) and other species as appropriate, from area surrounding burned site to be used in seeding 1,089 acres of Quino Checkerspot habitat. Distribution (by broadcast seeding, hand or mechanical) of collected seed in burned areas, as appropriate.

Specification # 7 Herbicide Treatment – Cut stump treat tamarisk and other woody exotic plants with undiluted Garlon or other triclopyr formulation with a surfactant. Treat weeds within susceptible burned areas that will convert the native plant community to protect the ecological integrity and productivity of designated critical habitat supporting 2 federally listed animal species on lands administered by the SDNWR. Approximately 9 acres will be treated.

Specification # 11 Replace Boundary Fence – Reconstruct approximately 11.7 miles of protective fences on the San Diego National Wildlife Refuge burned by the Harris Fire. All burned fence materials will be removed. Fences will be used to protect designated Critical Habitat for the California gnatcatcher, Otay tarplant, and Quino checkerspot butterfly from OHV traffic and allow for natural recovery of vegetation.

Specification # 9 New Temporary Protective Fence – Construct approximately 22.4 miles of new temporary fence on San Diego National Wildlife Refuge burned by the Harris Fire. Prior to the Harris Fire dense mature vegetation restricted access in the San Diego National Wildlife Refuge. This vegetation was destroyed by the fire and the lands are now barren and open to OHV traffic and livestock on adjoining lands. Fences will be used to protect designated Critical Habitat for the California gnatcatcher, Otay tarplant, and the Quino checkerspot butterfly from OHV traffic and allow for natural recovery of vegetation.

Specification # 10 Remove Burnt Interior Fence – Remove approximately 2.5 miles of interior fencing materials on San Diego National Wildlife Refuge that was damaged or destroyed by the Harris Fire. Removal will prevent the fence material from becoming covered by vegetation and being a safety hazard to park personnel and the public.

Specification # 4 Monitoring Critical Habitat Treatments - Monitoring effectiveness of invasive weed treatments and re-seeding to recover Quino Checkerspot butterfly, coastal California gnatcatcher, and least Bell's vireo designated Critical Habitats. Monitoring actions to stabilize designated critical habitat is needed to determine if further recovery actions are needed. In

addition, monitoring of Quino checkerspot butterfly mortality and loss of population resilience caused by the fire will be conducted to determine if butterflies are responding to treatments and if further measures are needed (e.g. butterfly ranching; reintroduction of captive reared larvae). Approximately 64 surveys will be performed on San Diego National Wildlife Refuge lands.

Non-Specification Related Management Recommendations

All agencies that administer lands in the respective fires should work towards forming a local Weed Management Area (WMA) with other federal, state, county, and local governments and groups interested in integrated weed management in San Diego County. Noxious weeds will continue to invade native vegetation communities with or without fire and a concerted effort is needed to implement early detection throughout the county. With increased human population and increased human caused fire ignitions, a WMA will be able to address vegetation communities that become impacted by fire and weeds.

All the respective agencies should work towards developing an integrated management plan to address habitat fragmentation in the coastal sage scrub and the Southern California dry mesic chaparral vegetation types.

The BLM and FWS should establish permanent fire effects plots in each vegetation type within the burns. Long term monitoring will help develop recovery trends that are useful for developing stabilization and rehabilitation specifications for fires in the future. Plots should also be established at locations of known Sensitive Plant Species to monitor their effects from the fire and potential recovery.

Pauma Forest Reserve

An inventory should be completed to determine the effects of the fire on the timber stands on slopes less than 40% and to determine stocking levels and species composition. The forest plan, which is in the process of being approved, should be revisited with the new data to determine potential changes to management strategies as a result of the fire.

Potential revisions to the forest plan should include provisions to increase fuels treatment activities in the reserve to reduce the level of manzanita in the Coulter pine/chaparral type. Fuels management would reduce impacts from future fires on the Coulter Pine/Chaparral community. This in turn would provide watershed stability on the top of the Agua Fria and Frey drainages.

If possible, periodic prescribed fire measures should be included in the plan to maintain low fuel loadings in the treated mixed conifer and Coulter Pine/Chaparral communities.

Bureau of Indian Affairs

The Bureau of Indian Affairs needs to perform, or contract to perform, noxious and invasive weed surveys on all reservations within the jurisdiction of the Southern California Agency. A data layer of noxious and invasive weed species in a Geographic Information System (GIS) will allow treatments to occur under the ES policy after fire, and will facilitate the quick retrieval of important infestation data.

The Bureau of Indian Affairs, Southern California Agency, should prepare a Programmatic Environmental Assessment to facilitate the treatment of noxious and invasive weeds occurring on reservation trust lands.

Bureau of Land Management

The Bureau of Land Management, Palm Springs-South Coast Field Office, should contract for the inventory of noxious and invasive weed infestations on lands managed under their jurisdiction.

This will facilitate the treatment, under BAER ES policy, on all lands that may be impacted from fire. The inventory will also provide information to agency resource staff allowing early treatment of weeds to prevent further expansion of the infestation.

V. CONSULTATIONS

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VI. REFERENCES/LITERATURE SEARCH

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BURNED AREA EMERGENCY STABILIZATION PLAN

2007 SOUTHERN CALIFORNIA FIRES

CULTURAL RESOURCE ASSESSMENT

- Assess potential damage to cultural resources for the purpose of recommending treatments to stabilize archaeological sites, traditional cultural properties, and historic structures from adverse effects of wildland fire, suppression activities, post fire erosion, and emergency stabilization and rehabilitation projects.
 - Conduct assessments necessary to meet Federal legal mandates.
 - Consult with appropriate Native American tribes as necessary to meet Federal legal requirements, agency policies, and agreements.
 - Avoid or mitigate adverse effects to cultural resources that may result from emergency stabilization treatments.
-
- Known or previously documented historic and prehistoric cultural resources potentially affected by three of the 2007 Southern California Fires (Poomacha, Witch, and Harris) suppression activities, or proposed emergency stabilization treatments.
 - Undocumented cultural resources discovered as the result of the fire or potentially affected by three of the 2007 Southern California Fires fire suppression activities, or proposed emergency stabilization treatments.
 - Cemeteries on tribal lands potentially affected by the fires, suppression activities, or proposed emergency stabilization treatments.

III. OBSERVATIONS

Local Prehistory

The following section is quoted from Robbins-Wade (2005).

“Several summaries discuss the prehistory of San Diego County and provide a background for understanding the archaeology of the general area surrounding the project. Moratto's (1984) review of the archaeology of California contains important discussions of Southern California, including the San Diego area. Bull (1983, 1987), Carrico (1987), Gallegos (1987), and Warren (1985, 1987) provide summaries of recent work and interpretations. The following is a brief discussion of the culture history of the San Diego region.....

.....The earliest accepted archaeological manifestation of Native Americans in the San Diego area is the San Dieguito complex, dating to approximately 10,000 years ago (Warren 1967). The San Dieguito complex was originally defined by Rogers (1939), and Warren published a clear synthesis of the complex in 1967. The

material culture of the San Dieguito complex consists primarily of scrapers, scraper planes, choppers, large blades, and large projectile points. Rogers considered crescentic stones to be characteristic of the San Dieguito complex as well..... Until relatively recently, many archaeologists felt that the San Dieguito culture lacked milling technology and saw this as an important difference between the San Dieguito and La Jolla complexes. Sleeping circles, trail shrines, and rock alignments have also been associated with early San Dieguito sites.....

The traditional view of San Diego prehistory has the San Dieguito complex followed by the La Jolla complex at least 7000 years ago, possibly as long as 9000 years ago (Rogers 1966). The La Jolla complex is part of the Encinitas tradition and equates with Wallace's (1955) Millingstone Horizon, also known as Early Archaic or Milling Archaic. The Encinitas tradition is generally "recognized by millingstone assemblages in shell middens, often near sloughs and lagoons" (Moratto 1984:147). "Crude" cobble tools, especially choppers and scrapers, characterize the La Jolla complex (Moriarty 1966). Basin metates, manos, discoidals, a small number of Pinto series and Elko series points, and flexed burials are also characteristic.....

In recent years, archaeologists in the region have begun to question the traditional definition of San Dieguito people simply as makers of finely crafted felsite projectile points, domed scrapers, and discoidal cores, who lacked milling technology. The traditional defining criteria for La Jolla sites (manos, metates, "crude" cobble tools, and reliance on lagoonal resources) have also been questioned (Bull 1987; Cárdenas and Robbins-Wade 1985; Robbins-Wade 1986). There is speculation that differences between artifact assemblages of "San Dieguito" and "La Jolla" sites reflect functional differences rather than temporal or cultural variability (Bull 1987; Gallegos 1987). Gallegos (1987) has proposed that the San Dieguito, La Jolla, and Pauma complexes are manifestations of the same culture, with differing site types "explained by site location, resources exploited, influence, innovation and adaptation to a rich coastal region over a long period of time" (Gallegos 1987:30). The classic "La Jolla" assemblage is one adapted to life on the coast and appears to continue through time (Robbins-Wade 1986; Winterrowd and Cárdenas 1987). Inland sites adapted to hunting contain a different tool kit, regardless of temporal period (Cárdenas and Van Wormer 1984).....

The Late Prehistoric period is represented by the San Luis Rey complex in northern San Diego County and the Cuyamaca complex in the southern portion of the county. The San Luis Rey complex is the archaeological manifestation of the Shoshonean predecessors of the ethnohistoric Luiseño (named for the San Luis Rey Mission). Agua Hedionda is traditionally considered to be the point of separation between Luiseño and Northern Diegueño territories. The Cuyamaca complex represents the Yuma forebears of the Kumeyaay (Diegueño, named for the San Diego Mission). The San Luis Rey complex (SLR) is divided into two phases, SLR I and SLR II. Elements of the SLR complex include small, triangular, pressure-flaked projectile points (generally Cottonwood series, but Desert side-notched series also occurs); milling implements: mortars and pestles, Manos and metates, and bedrock milling features; bone awls; *Olivella* shell beads; other stone and shell ornaments; and cremations (Meighan 1954; Moratto 1984; True et al. 1974). The later SLR II complex also includes several elements not found in the SLR I complex: "pottery vessels, cremation urns, red and black pictographs, and such nonaboriginal items as metal knives and glass beads (Meighan 1954:223). SLR I was originally thought to date from A.D. 1400 to A.D. 1750, with SLR II dating between A.D. 1750 and A.D. 1850 (Meighan 1954). However, that division was based on the assumption that the Luiseño did not practice pottery manufacture until just prior to the arrival of the Spanish. The chronology has since been revised due to evidence that pottery may have been introduced to the Luiseño circa A.D. 1200-1600. Ceramics were probably introduced from the Luiseños' southern neighbors, the Kumeyaay (True et al. 1974)."

Ethnography

The native peoples San Diego are comprised of the Luiseno in the north and the Kumeyaay in the south. Although linguistically set apart, (the Luiseno being Southern Takic speakers of the greater Uto-Aztecan language family while the language spoken by the Kumeyaay is a Yuman variant, and part of the Hokan family of language), both groups followed a similar hunting and gathering subsistence strategy with a settlement pattern that favored valley bottoms near streams for villages with seasonal camps strategically placed in environmental settings coincident with the availability of favored resources. In particular, the Kumeyaay lived in well-defined clan territories (Sh'mulq) Connolly (2007). For the Kumeyaay this meant summer residence in the mountainous portions of southern San Diego County and into to Baja California, with

winter residence requiring a long trek from the mountains to the low desert country to the East. Both the Luiseno and the Kumeyaay reckoned descent through patrilineal lines. The Luiseno differed from the Kumeyaay as well as their Takic speaking neighbors to the north and east by the expression of a rigid social structure and higher population densities. Such differences are particularly evident with the presence of a defined class structure including clearly defined ruling families that provided a mechanism to link together the various Luiseno Rancherias throughout their ethnic territory, Bean and Shipek (1978).

History

The Euro-American historic period begins with the Portola expedition in 1796 followed by the establishment of missions at San Diego, and San Luis Rey. During the Mexican period many Luiseno peoples were forced to work as indentured laborers on Mexican rancheros. After the United States took possession of California, Anglo-Americans began arriving in the area to practice cattle and sheep ranching, an activity that has continued to the present day, albeit in a much abbreviated form. In 1863, a smallpox epidemic proved disastrous for the local indigenous populations with both the Luiseno and the Kumeyaay experiencing significant population declines.

Remnants of the Barrett Stage Road remain on BLM lands within the Harris Fire. In 1868 it was announced that a stagecoach route would be opening between San Diego and Yuma. This route encountered problems, not the least of which was that a portion crossed into Mexico, that were resolved the following year with a new route that ultimately shaved 25 miles off the old route through Warner Springs and required less travel through the desert. Remnants of this route, the Barrett Stage Road, remain on BLM lands within the Harris Fire. In 1870, gold was discovered in the region. Most mining activities were conducted in the area around Julian, however some assaying activities occurred in the Harris Fire vicinity and in a few areas of the Witch Fire. Mining activity declined in the late 1870's, then picked up again in the late 1880's and continued over the next decade. While a renewed interest in the mines occurred during the Great Depression, the mining conducted today is primarily recreational.

A. Background

Cultural resources considered in this assessment are located on Department of the Interior jurisdictions within each fire. These include lands administered by the Bureau of Indian Affairs, Bureau of Land Management, and the U.S. Fish and Wildlife Service.

The BAER Team received an initial team briefing on October 30, 2007. Dan Hall and Carla Burnside, South Zone BAER Archaeologists, were additionally briefed at this time by BLM on issues relating to cultural resources on BLM lands.

Dan Hall contacted several affected tribes during the week prior to the arrival of the BAER Team and remaining contacts were made by BAER archaeologists prior to entering tribal lands. Contact with the California State Historic Preservation Office (SHPO) was initiated on November 7, 2007 after the team had an opportunity to determine what, if any cultural resources had been impacted by the fires, suppression activities, or would be subject to erosion on Federal and Tribal jurisdictions.

Due to the extent of these incidents and limited access to interior portions of the fires, only a sample of sites considered to be eligible for inclusion on the National Register; unevaluated sites containing midden deposits in or immediately adjacent to drainages; and sites in areas vulnerable to erosion or flooding were field checked during BAER Team reconnaissance surveys. Previously recorded historic sites and tribal cemeteries were also visited if they were at risk of flooding or erosion.

B. Reconnaissance Methodology and Results

Specific to prehistoric site sensitivity, the steep slopes of the fire areas are considered to be of low sensitivity. Nevertheless, certain activities may occur on slopes on moderate to high gradients. Drainages, lower slopes and areas near the mouths of canyons and ridgelines are considered as high sensitivity. Most of the remainder of the fire areas is considered to be moderate to high sensitivity for detecting prehistoric sites. All springs and waterways are also considered favorable locations. Traditional Cultural Properties and areas sacred to the Indian Tribes may occur any place favorable resources occur or where traditional uses or religious practices dictate.

**2007 Southern California Fires
Acres by Ownership Considered in the Cultural Resources Assessment**

Jurisdiction	Acres
Bureau of Indian Affairs	21,297
Bureau of Land Management	2,683
Total Acres	23,980
Bureau of Indian Affairs	10,302
Bureau of Land Management	1,066
Total Acres	11,368
Bureau of Land Management	18,217
U.S. Fish and Wildlife	4,137
Bureau of Indian Affairs	< 1
Total Acres	22,354
Total Acres	57,702

Two hundred and twenty-two archaeological and historic sites are within lands burned by the fires. A review of available records for the presence of rock shelters, rock art, cultural depth of deposit (habitation), and historic sites with wooden elements present, allowed a determination to be made of which sites should be considered for assessment. The rationale for selecting these site types is that while the 156 bedrock milling features, lithic scatters and pot drops (pottery associated with a single vessel) can contribute limited types of archaeological information; they are not subject to further loss of significant information due to post-fire effects. This effort resulted in 66 sites considered for assessment of fire effects.

In addition to prehistoric and historic sites, six tribal cemeteries on BIA administered lands within the fire perimeters or below burned areas were assessed for potential erosion.

Pedestrian survey and/or GIS analysis was initiated for watershed treatments at Barona, La Jolla, Mesa Grande, Pala, Pauma, and Rincon Reservations.

2007 California Fires
Archaeological Sites, Sites Assessed, and Treatments Recommended

Jurisdiction	Recorded Sites	Sites Assessed	Site Treatments Recommended
Poomacha Fire			
Bureau of Indian Affairs	83	24	5
La Jolla	45	8	2**
Pala	3	3	1
Pauma	12	6	1
Public Domain Allotment	4	4	0
Rincon	16	3	1*
San Pasqual	0	0	0
Bureau of Land Management	3	0	0
Witch Fire			
Bureau of Indian Affairs	62	23	0
Barona	18	18	0
Capitan Grande	0	0	0
Inaja-Cosmit	2	1	0
Mesa Grande	43	4	0
Santa Ysabel	1	1	0
Bureau of Land Management	0	0	0
Harris Fire			
Bureau of Indian Affairs	0	0	0
Jamul Indian Village	0	0	0
Bureau of Land Management	42	17	2
U.S. Fish and Wildlife Service	35	2	0
TOTAL	222	66	7
** Cemetery Protection Watershed Treatment and prehistoric site protection			
* Cemetery Protection Watershed Treatment			

C. Findings

1. Three of the prehistoric sites considered for assessment of post-fire effects from runoff events will require stabilization treatments. Fire suppression is not currently known to have detrimentally impacted any of these sites. However, it will be up to the local agencies to inventory areas subject to suppression for such verification. With the exception of an abandoned mine and three wells on BLM lands, the remaining sites are not located in areas proposed for other treatments.
2. The loss of the protective vegetation cover at archaeological sites from the effects of fire can create a situation whereby significant cultural values may be at a greater than normal risk from looting. However, since most of these sites are located in areas of restricted access, or in high visibility areas that would discourage such activity, it is believed that this is an acceptable short-term risk that will no longer be a factor once the vegetative cover is re-established.
3. Two of the six cemeteries assessed by the team will require treatments to prevent erosion and flooding. These treatments are described in the Watershed Assessment and treatment specification for structure protection.
4. Four previously unreported sites, two at La Jolla, one a Santa Ysabel, and one on fee lands owned by the Pala Tribe were identified during field reconnaissance.
5. Portions of the Barrett Stage Road are at risk of rock fall and erosion until vegetative cover is re-established. Improper maintenance of the road after significant precipitation or rock fall could result in degradation of the historical integrity of the road.

IV. RECOMMENDATIONS

A. Emergency Stabilization

1. Management –

Spec # BIA-4 – Archaeological Site Protection

Description: Install sand bags to prevent flood water and debris from entering an archaeological site. A large occupation site located above a watershed that has experienced high vegetation mortality is at risk from flooding and scouring. A treatment is recommended along a 35 feet stretch above the stream where the natural berm is no longer present. Treatment specifications call for the installation of sandbags stacked four-high between the creek and the site to mitigate the loss of midden deposits that would otherwise occur.

Spec # BIA-5 – Archaeological Site Stabilization

Description: Install slope stabilization treatments at a prehistoric site on Pauma Reservation. An extensive complex, consisting of numerous features and midden, is located on a variable sloped area at the precipice of the steep south flank of Palomar Mountain. The area has been totally denuded as the result of the fire, and exhibits moderate to high burn severity. Recommendations are to install 25' straw wattles along strategic slopes within the site to slow the movement of sediment, and thereby function to protect site constituents from displacement.

B. Management Recommendations (non-specification related)

Tribal Lands

- Close access to areas containing documented cultural resource sites for one year or until significant revegetation has occurred to obscure sites from looting. This will also reduce damage from Off-Road-Vehicle traffic across sites.
- An opportunity exists to conduct archaeological survey of previously undocumented areas within the fire perimeter and can confirm the accuracy of previously recorded site boundaries.

Bureau of Land Management - Palm Springs – South Coast Field Office

- Close all access points within the fire perimeter of the Harris Fire for one year or longer, until significant revegetation has occurred to obscure cultural resource sites.
- On BLM administered lands within the Harris, and Poomacha Fires, law enforcement patrols should be increased near cultural resource sites to prevent looting.
- On the Harris Fire consider posting “No Vehicle” signs in the vicinity of cultural resource sites to prevent Off-Road-Vehicle traffic across sites. Signs should not refer to cultural sites in the area.
- Vehicles used for fence repair should not be driven across cultural sites. All fence construction within site boundaries should be conducted without the use of motorized vehicles.

- An opportunity exists to conduct archaeological survey of previously undocumented areas within the fire perimeter.
- BLM should close all vehicle access to the historic Barrett Stage Road to prevent further deterioration of this historic property. If closure is not possible BLM should enter into a maintenance agreement with the US Border Patrol concerning allowable maintenance of the road that will not affect the historical integrity of the property.

U. S. Fish and Wildlife – San Diego National Wildlife Refuge

- Herbicide spraying on cultural sites should be conducted without vehicles being driven across prehistoric sites and seeding should be conducted by hand without raking.
- An opportunity exists to conduct archaeological survey of previously undocumented areas within the fire perimeter and can confirm the accuracy of previously recorded site boundaries.

V. CONSULTATIONS

Councilman Tony Rodriquez, Barona Band of Mission Indians
 Councilman Fred Nelson, La Jolla Band of Luiseno Indians
 Councilman Walter Powvall, La Jolla Band of Luiseno Indians
 Vice-Chair Bo Mazzetti, Rincon Band of Mission Indians
 Tribal Chair William Mesa, and Councilwoman Charlene Chamberlain, Jamul Indian Village
 Tribal Secretary Cindy Rivera, Mesa Grande Band of Indians

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Robbins-Wade, Mary**

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California TM5410; Log No. 04-02-052. Affinis. El Cajon, CA 92019.**

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BURNED AREA EMERGENCY STABILIZATION PLAN

2007 SOUTHERN CALIFORNIA FIRE

WILDLIFE RESOURCE ASSESSMENT

I. OBJECTIVES

- Assess the effects of fire and suppression actions to Federally Listed Threatened and Endangered Species and Designated Critical Habitats on U.S. Fish and Wildlife Service, Bureau of Land Management, and Tribal Lands
- Conduct Section 7 Emergency Consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service (if necessary).
- Prescribe emergency stabilization measures and/or monitoring and assess the effects of these actions to listed species and designated critical habitat.

II. ISSUES

A. T&E Habitat Stabilization/Recovery-

Four federally listed endangered species (Quino checkerspot butterfly [*Euphydryas editha quino*], arroyo toad [*Bufo californicus*], least Bell's vireo [*Vireo bellii pusillus*], and southwest willow flycatcher [*Empidonax traillii extimus*]) and one federally threatened species (coastal California gnatcatcher [*Polioptila californica californica*]) occur within the fire areas. Four of the above species (Quino checkerspot butterfly, least Bell's vireo, southwest willow flycatcher, and coastal California gnatcatcher) also have designated critical habitat within the fire area. Impacts to these species and their habitats from the fire, suppression actions, and proposed emergency stabilization actions are addressed.

III. OBSERVATIONS

The purpose of this Burned Area Emergency Response (BAER) Wildlife Assessment is to document the effects of the fire, suppression activities, proposed stabilization treatments, and potential post fire flooding and sediment delivery to all federally listed threatened and endangered species and designated critical habitats within the fire area. This assessment includes effects to species that occur on lands under the jurisdiction of the U.S. Fish and Wildlife Service- San Diego National Wildlife Refuge Complex (SDNWRC), Bureau of Land Management California Desert District (BLM), and lands held in trust by the U.S. Government for the Santa Ysabel Band of Mission Indians, Rincon Band of Luiseno Indians, La Jolla Band of Luiseno Indians, San Pasqual Band of Mission Indians, Barona Group of the Capitan Grande Band of Mission Indians, Inaja-Cosmit Band of Mission Indians, Mesa Grande Band of Diegueno Mission Indians, Pala Band of Luiseno Mission Indians, and Pauma-Yuima Band of Mission Indians. Separate BAER assessments are being prepared by the Cleveland National Forest BAER Team to address fire effects to the national forest system lands with the Harris, Witch and Poomacha Fire perimeters. There are numerous other BAER Teams in the southern California area addressing issues on state, county, city, and private lands.

This assessment also includes information on the Emergency Section 7 Consultation for these incidents. Emergency Consultation was initiated with the U.S. Fish and Wildlife Service, Carlsbad Field Office (FWS-CFO) on October 29, 2007. A Fish and Wildlife Biologist from the Carlsbad Field Office has been involved with the BAER process as part of the Emergency Consultation to minimize effects to listed species and their habitats.

Species addressed for the Harris, Witch, and Poomacha Fires include all federally listed species and designated critical habitats from current FWS lists. Numerous other sensitive species and habitats identified by the Multiple Species Conservation Program occur within the fire areas. Although these species may have been potentially affected by the fires, BAER policy only allows for treatment of federally listed species and designated critical habitats (BAER ES Handbook Section 4.2.9). Non-specification, general recommendations are made. Species of cultural

significance and their habitats also occur within the fire areas, it was determined through discussion with BIA and tribal representatives that assessment of fire effects to these species was beyond the scope of this assessment.

A. Background

Detailed discussion of fire causes, start locations and times, behavior, and suppression actions is provided in the BAER Operations Assessment section, incident action plans, and Incident Command Team Transition Narratives. Approximately 305,000 acres burned across San Diego County during the Harris, Witch, and Poomacha Fires (Table 1). In general fire behavior was characterized by low live fuel moistures, unseasonably high temperatures, low relative humidity, and strong Santa Ana winds with sustained winds at 20-30 mph and gusts to 60 mph. These conditions resulted in explosive fire behavior with extremely rapid rates of spread. Because of this, the majority of the acreage burned within 2-3 days of the start.

Ownership	Harris Fire	Witch Fire	Poomacha Fire
FWS	4,137	0	0
BLM	18,217	1,066	2,683
BIA	0	10,302	21,297
USFS	4,457	44,068	5,274
State	2,490	489	1,586
County	932	1,975	1,673
City	5,596	22,702	45
Other	46,140	2,399	1,099

Vegetation

The Harris, Witch, and Poomacha fires burned through a variety of habitat types (Tables 2-4). Dominant vegetation types are coastal sage scrub, chaparral, oak woodlands and cottonwood/willow riparian zones. Vegetation communities were impacted to varying degrees due to differential vegetation mortality and burn severity. Levels of soil burn severity (fire effects to soils) are presented for each fire in table 5. A detailed description of vegetation communities and fire effects to plant species is provided in the BAER Vegetation Assessment. Also see Pre-fire Vegetation Communities and Vegetation Mortality Maps.

	FWS	BLM	BIA	USFS	Other	Total
Agriculture	0	1	0	0	54	55
Annual Grassland	146	474	0	13	4,039	4,672
Disturbed	0	4	0	3	27	34
Mixed Conifer	0	9	0	23	14	47
Oak Woodland	0	69	0	186	472	727
Open Water	0	0	0	0	10	11
Perennial Grassland	0	0	0	0	26	26
Riparian	4	82	0	39	771	896
Southern CA Coastal Scrub	2,448	6,629	0	52	26,713	35,842
Southern CA Dry Mesic Chaparral	1,523	10,694	0	3,979	30,385	46,581
Southern CA Oak Savanna	15	252	0	162	903	1331
Urban	1	2	0	0	119	122
Total	4,136	18,217	0	4,457	63,535	90,345

Table 3. Major vegetation types occurring within the burn perimeter of the Witch Fire.						
	FWS	BLM	BIA	USFS	Other	Total
Agriculture	0	1	9	10	4,438	4,458
Annual Grassland	0	11	337	605	11,116	12,068
Disturbed	0	25	1	56	100	181
Mixed Conifer	0	0	30	834	310	1,175
Oak Woodland	0	30	1,102	2,212	2,767	6,111
Open Water	0	0	0	0	1,039	1,040
Perennial Grassland	0	0	1	1	269	271
Riparian	0	8	392	950	2,327	3,676
Southern CA Coastal Scrub	0	94	1,705	3,426	22,230	27,455
Southern CA Dry Mesic Chapparal	0	821	5,856	31,598	51,296	89,572
Southern CA Oak Savanna	0	77	1,017	4,370	8,530	13,994
Urban	0	0	3	4	3,102	3,110
Total	0	1,066	10,452	44,068	107,525	163,111

Table 4. Major vegetation types occurring within the burn perimeter of the Poomacha Fire.						
	FWS	BLM	BIA	USFS	Other	Total
Agriculture	0	2	156	6	625	789
Annual Grassland	0	1	759	19	1,205	1,984
Disturbed	0	0	52	2	8	62
Mixed Conifer	0	83	2,723	2,194	2,647	7,647
Oak Woodland	0	346	3,143	1,483	3,797	8,768
Open Water	0	0	0	0	0	0
Perennial Grassland	0	0	5	0	7	11
Riparian	0	56	657	202	723	1,638
Southern CA Coastal Scrub	0	69	2,226	39	1,710	4,044
Southern CA Dry Mesic Chapparal	0	1,430	7,291	777	8,050	17,549
Southern CA Oak Savanna	0	697	3,033	554	2,754	7,038
Urban	0	0	21	0	20	41
Total	0	2,683	20,066	5,277	21,546	49,572

Table 5. Soil burn severity categories within the Harris, Witch, and Poomacha Fires, 2007.				
Soil Burn Severity	Harris Fire	Witch Fire	Poomacha Fire	Totals
Unburned to Very Low	49,691	89,910	17,810	157,411
Low	39,359	49,118	12,669	101,146
Moderate	1,294	23,780	16,966	42,040
High	0	302	2,117	2,419
			Grand Total	303,016

B. Reconnaissance Methodology and Results

Information used in this assessment was generated from review of relevant literature, recovery and management plans, GIS databases, and discussion with species experts from USFWS, BLM, USGS-BRD, USFS, BIA, and consulting biologists. Field reconnaissance consisted of on site

inspection of known species occurrence sites and designated critical habitat areas. Field visits to the Harris, Witch, and Poomacha Fires were conducted on October 29- November 7, 2007. In addition, three aerial reconnaissance flights were conducted from helicopters in order to assess inaccessible areas and gain a landscape level perspective on fire effects. Flights of fire areas were conducted on October 31 (Harris Fire), November 2 (Witch Fire), and November 4 (Poomacha Fire). Resource advisors that took part in field/aerial reconnaissance included Kurt Roblek (FWS-CFO), Jill Terp (FWS-SDNWR), Tiffany Lovato (Rincon Tribe), Randy Nagel (FWS-CFO), Mike Dolan (BAER Vegetation Specialist), and the BAER Watershed Unit. Field notes were transcribed to Unit Logs (Form ICS 214) and included in the BAER file provided to FWS, BIA, and BLM. The Burn Severity and Vegetation Mortality Maps referenced in this assessment were generated by the BAER Watershed Unit and BAER Vegetation Unit.

The FWS Carlsbad Field Office (CFO) has jurisdiction over the listed species within the area of the fires. Identification of known listed species occurrences and critical habitat is crucial to accurately assessing fire affects. The Carlsbad Field Office maintains extensive GIS databases on listed species occurrence locations and critical habitat layers. All of this data was made available to the BAER Team for analysis and was supplemented by California Natural Diversity Database, Multiple Species Conservation Program Regional Database, and data provided by species experts with ongoing research in the area. Randy Nagel, GIS Specialist from CFO, served as the BAER Wildlife GIS Specialist throughout the assignment. Maps with threatened and endangered species occurrence locations and designated critical habitat were generated from the above data sources (See Wildlife Maps- Appendix 4).

This Wildlife Assessment is a summary of fire effects to wildlife and their habitats. While the effects of the fires to the vegetation that makes up their habitats is discussed, a more thorough coverage of impacts to vegetation communities and watersheds can be found in the BAER Vegetation and BAER Soil and Watershed Assessments. These reports contain more detailed description of pre and post fire vegetation, post fire vegetation recovery estimates, run-off and debris flow estimates, and modeling of channel cross-sections.

As stated above, the purpose of this assessment is to discuss the potential effects of the fire, suppression activities, and proposed emergency stabilization actions to federally listed threatened and endangered species and designated critical habitat that occur within, immediately adjacent to, or downstream from the Harris, Witch, and Poomacha Fires. Effects to other wildlife species are not discussed. This assessment is not intended to definitively answer the many questions of effect to specific species that arise during a series of incidents such as the 2007 Southern California Wildfires. The purpose of this assessment is to determine the need for immediate, emergency actions that may be necessary to prevent further negative effects to listed species. Because the species discussed in this assessment have ranges that extend beyond the fire perimeters, it is important to include information at larger scale and across land ownership boundaries when discussing potential impacts to species as a whole and the need for long-term rehabilitation.

C. Findings

Analysis of GIS databases, species occurrence maps, and consultation with species experts indicates that each fire had threatened and endangered species occurrences and/or Designated critical habitat. Most occurrences and critical habitat are within the Harris Fire perimeter on SDNWRC and BLM lands (see Wildlife Maps- Appendix 4). Coastal California gnatcatcher, arroyo toad, and southwest willow flycatcher have been detected in a few locations on DOI land within the Poomacha Fire perimeter, and the southwest willow flycatcher has a small amount of habitat. Within the Witch Fire perimeter, the arroyo toad has been documented on DOI lands in only one location and there is a limited amount of CAGN Designated Critical Habitat.

1. 2007 Southern California Fires (Harris, Witch, and Poomacha) Species List

A species list was obtained on October 29, 2007 from Kurt Roblek, FWS-CFO (Supporting Documentation No. 34-35). The list was generated for all species potentially occurring within fire perimeters or subject to fire effects outside the perimeters (e.g. downstream sediment flows).

Information provided for the fire areas was reviewed and refined by FWS GIS specialist Randy Nagel to determine which species may occur within the fire areas on DOI lands. The below list is for U.S. Fish and Wildlife Service, Bureau of Land Management, and Bureau of Indian Affairs lands only. The list was reviewed by and/or discussed with Jill Terp (FWS-SDNWRC), John Martin (FWS-SDNWRC), Janaye Byargo (BLM), Lisa Northrop (BIA), and David Wooten (BIA) for accuracy. The following federally listed species occur, or have critical habitat within the fire area, could be affected by downstream impacts, or were potentially affected by fire suppression actions on DOI lands. Therefore the below five species are addressed in the BAER Wildlife Assessment.

SPECIES	SCIENTIFIC NAME	LISTING STATUS
Quino checkerspot butterfly	<i>Euphydryas editha quino</i>	Endangered with Critical Habitat
Arroyo toad	<i>Bufo californicus</i>	Endangered with critical habitat (outside of San Diego County)
Least Bell's Vireo	<i>Vireo bellii pusillus</i>	Endangered with Critical Habitat
Coastal California gnatcatcher	<i>Poliophtila californica californica</i>	Threatened with Critical Habitat
Southwest willow flycatcher	<i>Empidonax traillii extimus</i>	Endangered with Critical Habitat

The following species were identified as occurring inside the fire perimeter(s) but are not found on DOI lands, therefore they were not addressed in this assessment. This determination was made in consultation with FWS-CFO biologists, BLM personnel, BIA and tribal representatives, and local species experts.

SPECIES	SCIENTIFIC NAME	LISTING STATUS	REASON FOR NOT ADDRESSING IN THIS DOCUMENT
Laguna Mountain skipper	<i>Pyrgus ruralis lagunae</i>	E	Within fire perimeter(s) but not found on DOI lands
Stephen's kangaroo rat	<i>Dipodomys stephensi</i>	E	Within fire perimeter(s) but not found on DOI lands
San Diego fairy shrimp	<i>Branchinecta sandiegonensis</i>	E	Within fire perimeter(s) but not found on DOI lands

The following species were identified by FWS-CFO as federally listed species potentially existing within, adjacent to, or downstream from the fire areas. Through post fire reconnaissance, review of GIS data layers, and consultation with local experts, it was determined that these species were not affected by the portion of the fires assessed in this report (no habitat within or adjacent to the fire areas and/or inventories prior to the fires determined absence), or expected to be affected by potential post-fire flooding. These determinations of no effect were based on limited data provided by FWS and species experts. Additional information may exist but was not provided by the agencies involved for use in this assessment. These additional data may indicate the potential for additional effects to these species. If that is the case, the agency responsible for the lands those species occur on should assess effects and document concerns. The biologists may need to document species presence or absence by season and develop accurate habitat maps for each species for future use.

SPECIES	SCIENTIFIC NAME	LISTING STATUS	REASON FOR NOT ADDRESSING IN THIS DOCUMENT
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Riverside fairy shrimp	<i>Streptocephalus woottoni</i>	E	No habitat within fire perimeters; no occurrence data in fire area; no potential for downstream habitat to be affected by post-fire flooding or debris flow
Tidewater goby	<i>Eucyclogobius newberryi</i>	E	No habitat within fire perimeters; no occurrence data in fire area; no potential for downstream habitat to be affected by post-fire flooding or debris flow
Southern steelhead	<i>Oncorhynchus mykiss</i>	E	Trout in Pauma Creek determined by NMFS to not be part of Distinct Population Segment and therefore not covered by ESA; no potential for downstream habitat to be affected by post-fire flooding or debris flow
California red-legged frog	<i>Rana aurora draytoni</i>	T	No habitat within fire perimeters; no occurrence data in fire area; no potential for downstream habitat to be affected by post-fire flooding or debris flow
California condor	<i>Gymnogyps californianus</i>	E	No habitat within fire areas
Pacific pocket mouse	<i>Perognathus longimembris pacificus</i>	E	No habitat within fire areas

1. Biological Assessment for Federally Listed Species

Direct effects as described in this report refer to mortality or disturbance that result in flushing, displacement, or harassment of the animal. Indirect effects refer to modification of habitat and effects to prey species.

QUINO CHECKERSPOT BUTTERFLY: The federally listed Quino checkerspot butterfly currently occupies a range from northern Baja California, Mexico through San Diego and Riverside Counties. Historically their range extended throughout coastal California south of Ventura County, and east to the Tehachapi Mountains. More than 75% of this range has been lost, including 90% of their coastal mesa and bluff distribution (Brown 1991). Direct and indirect human impacts, including loss of habitat, fragmentation, and invasion by non-native plants are main causes for population decline (FWS 2003).

A primary host plant utilized by QCB is *Plantago erectum* (dwarf plantain), which is often found in dry, sandy soils on dunes, grassy hills, and flats (Rahn 1979). It is found in southern California in annual forbland, scrub, grassland, and open chaparral. QCB also relies on a variety of other annual forbs as nectar sources.

Within the Harris, Witch, and Poomacha Fires, only the Harris contained known locations and critical habitat within its perimeter on DOI lands. The Recovery Plan for the QCB identifies 6 recovery units. One of these, the Southwest San Diego Recovery Unit, was impacted by the Harris Fire. Over 50% of this Recovery Unit was burned and 61% of the designated critical habitat within the Recovery Unit boundary was burned. Known portions of population distributions are mapped using one kilometer radii around recent QCB observation locations. Where two observations have overlapping radii, they are

considered to be part of the same population. These spatially clustered QCB observations are called “occurrence complexes”. Seventy-five percent of the occurrence complexes within the Southwest San Diego Recovery Unit were affected by the Harris Fire. Furthermore, nearly 20% of the designated critical habitat in the recovery unit that was burned in 2007, was previously burned in 2003.

It is unclear if unaffected population segments are sufficient to retain long-term resiliency of populations within the Recovery Unit. Fire is considered a significant threat to QCB, especially when return intervals are short, and it was thought to be the final cause of the species' extirpation from Orange County in 1967. Depending on long-term effects to QCB, measures to stabilize degraded critical habitat through seeding and re-establish populations through translocations and captive-breeding programs (i.e. butterfly ranching) may be warranted.

DIRECT FIRE EFFECTS: Within the Southwest San Diego Recovery Unit, 36% of all detection locations recorded in the past 10 years burned over. Even though much of the Harris Fire experienced low vegetation mortality, the heat generated from a fast moving flame front was likely high enough to cause mortality in diapausing larvae located above ground.

INDIRECT FIRE EFFECTS: Levels of vegetation mortality in areas in QCB designated critical Habitat are illustrated in Table 6. A temporary loss of habitat may occur even in areas with low vegetation mortality. This habitat loss may be exacerbated if noxious weeds establish within fire affected areas. In contrast, the fire may indirectly benefit the species by opening areas for colonization by its host plant, *Plantago erectum*. This species grows best in open areas and may benefit the removal of vegetation and thatch by the fire. Seeding with appropriate native forbs and grasses is being recommended as a treatment to stabilize and prevent further degradation to designated QCB critical habitat.

Table 6. Acres of QCB Designated Critical Habitat within four vegetation mortality categories on the Harris Fire.		
Vegetation Mortality	Ownership	QCB Critical Habitat Acres
0-25%	FWS	1827
	BLM	198
	BIA	0
	Other Federal	3.1
	State	461
	City	4.8
	Other	787
26-50%	FWS	908
	BLM	119
	BIA	0
	Other Federal	0
	State	468
	City	1
	Other	514
51-75%	FWS	265
	BLM	62
	BIA	0
	Other Federal	0
	State	285
	City	0
	Other	202
76%+	FWS	64
	BLM	27
	BIA	0
	Other Federal	0

	State	64
	City	0
	Other	115
Total		7145

FIRE SUPPRESSION EFFECTS: Some backfiring was conducted during suppression activities on the Harris Fire in order to protect lives and property. No maps were made of these activities as suppression crews were fully engaged in suppressing the fire. One known backfire site was on San Diego NWR within QCB critical habitat. Some QCB may have been negatively impacted by this action, however this action affected a relatively small portion (<0.1%) of their entire critical habitat area. It is thought that the total acreage affected by this suppression action was insignificant relative to the total amount of habitat lost or modified throughout the fire areas across all land ownerships.

Approximately 1 mile (approximately 0.3 acres) of handline was cut on San Diego NWR within QCB habitat. Handline was rehabilitated under the supervision of resource advisors from the FWS-CFO. Proper rehabilitation techniques have minimized the effects to QCB. No dozer line was constructed or fire retardant dropped on designated critical habitat or species occurrence locations.

EMERGENCY STABILIZATION EFFECTS: There are no expected negative effects from most emergency stabilization treatments (see Specification Section, Part F for full details). Treatment for invasive weeds is being proposed in critical habitat areas to prevent the spread and establishment of invasive weeds and type conversion to non-native grassland habitats. The use of herbicide is intended to provide short and long term beneficial effects to federally listed species by managing exotic and nuisance plant species. Application methods will be previously approved by the FWS-CFO and conducted in a manner not likely to adversely affect the QCB.

POST-FIRE FLOOD EFFECTS: Effects of erosion on hill top habitat used by QCB was investigated to determine if top soil would be lost and if larvae diapausing underground would be covered up. Nearly all QCB Designated critical habitat and occurrence locations were in areas classified as low burn severity. The BAER Watershed group indicated that these areas are less likely to erode and form rills (mini channels created on the soil surface due to overland flow). Even within areas of high burn severity, it is estimated that approximately 5% of an individual hill slope will have a rill network form and experience sediment deposition in response to precipitation events. In addition, QCB prefer hill tops and upper slopes that experience less sediment deposition than canyon and valley bottoms.

POST-FIRE OBSERVATIONS: QCB were not observed during post fire reconnaissance.

ARROYO TOAD: The federally endangered arroyo toad is currently found in river basins in Monterey, Santa Barbara, Ventura, Los Angeles, Orange, Riverside, San Diego, and San Bernardino Counties. They have disappeared from 75% of their previously occupied habitat, with dam construction responsible for the loss of 40% of their original range (FWS, Fact Sheet).

Arroyo toads prefer shallow pools and open, sandy stream terraces with cottonwoods, oaks, or willows. They breed in streams that have enough water from late March to mid-June to support tadpoles until they metamorph into adults. Subadult and adult arroyo toads excavate shallow burrows on sand bars, or stream side terraces where they shelter during the day when the surface is damp, or for longer intervals during the dry season.

Arroyo toads occurred on DOI lands within the Harris, Witch, and Poomacha Fires. There are numerous other locations inside the fire perimeters on non-DOI lands and outside the fire perimeter. The arroyo toad has designated critical habitat, however none is located within San Diego County.

DIRECT FIRE EFFECTS: During dry periods of the year arroyo toads bury themselves in friable soils. The fast moving fire front would not have contributed much heat to the soil sub-surface. Field investigations supported this, as vegetation in arroyo toad habitat was largely unburned or suffered low vegetation mortality. This indicates that fire residence time in these areas was short, and sub-surface soil temperatures likely did not reach lethal levels. Therefore, it is believed that direct fire effects to this species were negligible.

INDIRECT FIRE EFFECTS: Loss of creek side vegetation within arroyo toad occurrence locations was low. Where the cottonwoods and willows on floodplains were top killed, the trees will rapidly regenerate from root crowns and root systems remain intact to help stabilize the soil. One concern expressed was based on observations following the 2003 fires, where mortality of native riparian vegetation allowed for the establishment of watercress in toad habitat (R. Fisher, USGS-BRD, pers. comm.). This covered much of the friable soils used by the toads for estivation and made the habitat less suitable. However, this was an isolated occurrence that was not observed in other burn areas.

The friable soils, sandy terraces, and shallow pools used by arroyo toads throughout their life cycle were not affected by the behavior of the fire. See below for a discussion of post-fire hydrological impacts.

FIRE SUPPRESSION EFFECTS: No dozer line, handline, backfiring operations or retardant drops were constructed/conducted within or adjacent to known arroyo toad occurrence locations. To date there were no known suppression activities that may have impacted the arroyo toad or their habitat.

EMERGENCY STABILIZATION EFFECTS: There are no negative effects expected from most emergency stabilization treatments (see Specification Section, Part F for full details). Within an area adjacent to known arroyo toad habitat, one treatment is prescribed to remove boulders from in front of culverts. This project is being prescribed to increase flow through culverts and prevent run-off from escaping the drainage where it would threaten adjacent houses. This project is located along a side channel that feeds into Paradise Creek (see Values at Risk Map JH-14). Boulders will be removed with an excavator that will remain on the concrete crossing. Trash and old sand bags will be removed from a section further upstream by hand. If the excavator remains on the road crossing, removes only boulders (no sediment), and upstream debris removal is completed by hand, it is unlikely that there will be any adverse effects to the arroyo toad. If project implementation deviates from the specification description, the appropriate tribal representative should re-initiate Section 7 Emergency Consultation with the FWS-CFO.

Treatment of invasive salt cedar (*Tamarix ramosissima*), and arundo (*Arundo donax*) are being proposed adjacent to arroyo toad habitat on the Rincon Reservation in order to prevent further invasion and habitat degradation. The use of herbicide is intended to provide short and long term beneficial effects to federally listed species by managing exotic and nuisance plant species. Avoidance and minimization measures for herbicide application in arroyo toad habitat have been outlined by FWS-CFO (Supporting Documentation No. 42). If minimization measures are followed this stabilization methods will not likely adversely affect the listed species.

POST-FIRE FLOOD EFFECTS: Concerns were expressed about debris flow and increased sedimentation in arroyo toad habitat (R. Fisher, USGS-BRD, pers. comm.; T. Lovato, Rincon Reservation, pers. comm.) on the San Luis Rey/Paradise Creek drainage (Poomacha Fire). BAER Hydrologists were consulted with and modeled flow and sediment delivery to a point at the confluence of the San Luis Rey River and Paradise Creek. This is an area of known arroyo toad occupation. During low rainfall events flow will be restricted to the main channel and not deposit sediment on the first and second level terraces used by estivating toads. Flows overtopping the banks of the channel will

deposit sediments on terraces. This area has a history of high flows even in non-fire years. In the short term this may bury some toads, however, episodic flooding may benefit these areas by keeping them free of vegetation and the soils friable enough for burrowing toads. There may also be short term impacts to arroyo to arroyo toads from the degradation of water quality. Post fire runoff is likely to contain higher than normal concentrations of nutrients and ash. This could degrade breeding pools, decrease available forage, and impact adult toads, tadpoles, or egg masses.

POST-FIRE OBSERVATIONS: No arroyo toads were observed during post-fire reconnaissance. Three pacific tree frogs were observed in an irrigation control box adjacent to Rincon Casino.

COASTAL CALIFORNIA GNATCATCHER: The federally threatened coastal California gnatcatcher (CAGN) occurs on coastal slopes in southern California, from Ventura to San Diego Counties, and into Baja California, Mexico (Winchell and Doherty 2006). They primarily inhabit coastal sage scrub (CSS) habitat, but can also be found in chaparral, grassland, and riparian habitats where they are adjacent to CSS. The CAGN is non-migratory and exhibits strong site fidelity, which makes it especially susceptible to habitat disturbances such as wildfire. It is insectivorous and its diet includes leaf and plant hoppers, and spiders. True bugs, wasps, bees, and ants are only minor components of the diet.

For the purposes of this analysis, impacts to both designated critical habitat and Modeled Habitat are discussed (Table 7). Approximately 4215 and 271 acres of designated critical habitat on DOI lands were burned on the Harris and Witch Fires, respectively (Tables 8 and 9). Approximately 1000 acres of the Critical Habitat on DOI lands affected in 2007 was also burned in 2003. Areas burned in 2003 had recovered to a point where they were nearly suitable for use again by CAGN. Such a short fire return interval threatens to type convert these areas to non-native grassland habitats. Modeled CAGN habitat (Developed by FWS-CFO), while it has no legal backing, provides an accurate measure of suitable CAGN habitat (C. Winchell, FWS-CFO, pers. comm.). It is a multivariate statistical model derived from CAGN occurrence in relation to a host of habitat variables, and includes multiple years of data. The model also has spatial elements that are mapped to provide probability of species occurrence in areas. A total of 38,553 acres of modeled habitat classified as high and very high quality burned.

Table 7. Coastal California gnatcatcher habitat within fire perimeters, across all ownerships.			
FIRE	Critical Habitat	Modeled CAGN Habitat Very High Classification	Modeled CAGN Habitat High Classification
Harris	7,145	12,384	12,404
Witch	16,680	7,358	5,322
Poomacha	0	0	349
Total	23,825	19,742	18,075

DIRECT EFFECTS: Any CAGN located on the flanks of the fire may have been able to fly away from the flaming front. This species exhibits high site fidelity and is not known to move long distances during daily activities (C. Winchell, FWS-CFO, pers. comm.). Individuals located in more interior locations were likely overcome by the fast moving flame front. Based on habitat models C. Winchell (FWS-CFO, species expert) estimates that 22-25 percent of the CAGN population in San Diego County may have been lost. This is a preliminary estimate based on the best available data at the time of writing. Extensive modeling of population dynamics will be conducted in the coming months to better understand direct fire effects.

INDIRECT FIRE EFFECTS: The CAGN will experience a temporary loss of habitat due to the fire effects on the coastal sage scrub vegetation community they depend on. Even areas that experienced low vegetation mortality will be unsuitable for CAGN, as the vegetation structure has been altered enough to not support nest sites or invertebrate forage species. These areas will recover much more quickly than those that experienced high vegetation mortality. Estimates of re-colonization of burned habitat range from 3-6 years depending on the level of vegetation mortality and previous fire history. A short fire return interval threatens to type convert coastal sage scrub habitat to an earlier successional stage habitat (e.g. grassland). Seeding with appropriate native forbs and shrubs is being prescribed to stabilize and prevent further degradation to CAGN designated critical habitat.

Concern was expressed that densities of CAGN in unburned areas may increase, due to the temporary loss of habitat and as individuals were driven out of burned areas (J. Martin, SDNWR, pers. comm.). Higher densities could result in decreased reproductive success as competition for resources increases.

Table 8. Acres of designated CAGN critical habitat in vegetation mortality categories within the Harris Fire, 2007.		
Vegetation Mortality	Ownership	Designated Critical Habitat Acres
0-25%	FWS	2,430
	BLM	184
	BIA	0
	Other Federal	3.3
	State	449
	City	4.8
	Other	795
26-50%	FWS	1,072
	BLM	90
	BIA	0
	Other Federal	0
	State	462
	City	2
	Other	513
51-75%	FWS	302
	BLM	91
	BIA	0
	Other Federal	0
	State	283
	City	2
	Other	206
76%+	FWS	67
	BLM	24
	BIA	0
	Other Federal	0
	State	94
	City	0
	Other	115
Grand Total		71,45

Table 9. Acres of CAGN designated critical habitat in vegetation mortality categories within the Witch Fire, 2007.		
Vegetation Mortality	Ownership	Designated Critical Habitat Acres
0-25%	FWS	0
	BLM	44
	BIA	0
	USFS	2,872
	State	0
	County	60
	City	33
	Other	2,926
26-50%	FWS	0
	BLM	113
	BIA	0
	USFS	3,657
	State	2
	County	195
	City	26
	Other	2,973
51-75%	FWS	0
	BLM	59
	BIA	0
	USFS	1,573
	State	0
	County	93
	City	10
	Other	721
76%+	FWS	0
	BLM	55
	BIA	0
	USFS	801
	State	0
	County	40
	City	7
	Other	415
Grand Total		16,675

FIRE SUPPRESSION EFFECTS: Some backfiring was conducted during suppression activities on the Harris Fire in CAGN critical habitat in order to protect lives and property. No maps were made of these activities as suppression crews were fully engaged in suppressing the fire. Some CAGN may have been negatively impacted by these actions, however this action affected a relatively small portion (<.1%) of their entire habitat area. The total acreage affected by this suppression action was insignificant relative to the total amount of habitat lost or modified throughout the fire areas across all land ownerships. Approximately 1 mile of handline (approximately 0.3 acres) was cut on San Diego NWR within CAGN habitat. Handline was rehabilitated under the supervision of resource advisors from the FWS-CFO. Proper rehabilitation techniques will make effects to CAGN negligible. No dozer line was constructed or fire retardant dropped on designated critical habitat or species occurrence locations.

EMERGENCY STABILIZATION EFFECTS: There are no expected negative effects from most emergency stabilization treatments (see Specification Section for full details). Treatment for invasive weeds is being proposed in critical habitat areas to prevent the spread and establishment of invasive weeds and type conversion to non-native grassland

habitats. The use of herbicide is intended to provide short and long term beneficial effects to federally listed species by managing exotic and nuisance plant species. Application methods will be previously approved by the FWS-CFO and conducted in a manner not likely to adversely affect the listed species.

POST-FIRE FLOOD EFFECTS: Erosion of top soil in CAGN critical habitat and species occurrence locations will be negligible. Soil burn severity was low in CAGN habitat and erosion potential and rill formation was determined to be low by the BAER Hydrology Unit. The root structures of shrubs, grasses, and forbs are largely intact, which will help stabilize the soils.

POST-FIRE OBSERVATIONS: CAGN were not observed during post fire reconnaissance.

LEAST BELL'S VIREO: The federally endangered least Bell's vireo is a migratory song bird dependent of riparian habitats for nesting (Kus et al. 2003). Once widespread and abundant throughout riparian woodlands in California and northern Baja California, Mexico, the species has undergone a significant decline during the past 40 years (Grinnell and Miller 1944), and by 1986 numbered just 300 pairs statewide (Recon 1989). This decline is due to loss and degradation of riparian habitat, as well as expansion in the range of brown-headed cowbirds (*Molothrus ater*), a brood parasite (Kus and Beck 1998).

The LBVI requires riparian habitat with an overstory of black willow, arroyo willow, cottonwood, and western sycamore, with a dense understory that is typically dominated by sandbar willow, mule fat, young arroyo and black willows, and numerous herbaceous species. Nests are primarily built within three feet of the ground in shrubs or trees providing dense cover. The most critical structural component to LBVI breeding habitat is a dense shrub layer at two to 10 feet above the ground. LBVI is primarily a leaf gleaning insectivore, with lepidoteran larvae making up the bulk of their diet.

The Harris Fire contains LBVI critical habitat and known species occurrence on DOI lands within its perimeter. These areas are on the west side of SDNWR in the Sweetwater River riparian corridor. Approximately 54 acres of critical habitat burned in this area. Local species experts expect LBVI to occur along the San Luis Rey drainage on DOI lands through the Poomacha Fire (B. Kus, USGS-BRD, pers. comm.), however access to these areas has been problematic and surveys have not been conducted.

DIRECT EFFECTS: Least Bell's vireo migrate south for the winter season in late summer and were not present when the fires burned.

INDIRECT EFFECTS: Riparian areas in designated critical habitat, known species occurrence locations, and high quality potential habitat experienced low to no vegetation mortality across all fires (Table 10). During reconnaissance, we observed burned drainage slopes, but in most drainages, the fire did not consume the riparian vegetation immediately adjacent to the creek bottom, though some understory shrubs, forbs, and grasses were impacted. This may result in a loss of some nesting and foraging habitat but it is expected to regenerate quickly. The low intensity vegetation mortality that was experienced by most riparian areas may result in an indirect benefit to LBVI. The fires may set back succession in these areas and prevent late successional, closed canopy habitats from developing. New growth in the understory will result in the dense shrub layer preferred by this species. In the short term adjacent areas opened by the fire have created more edge and may make breeding LBVI more susceptible to cowbird parasitism.

Table 10. Acres of designated critical habitat in vegetation mortality categories within the Harris Fire, 2007.		
Vegetation Mortality	Ownership	Designated Critical Habitat Acres
0-25%	FWS	29
	Other Non-DOI Federal	1

	State	105
	City	25
	Other	183
26-50%	FWS	13
	Other Non-DOI Federal	0
	State	111
	City	25
	Other	41
51-75%	FWS	5
	Other Non-DOI Federal	0
	State	107
	City	9
	Other	22
76%+	FWS	6
	Other Non-DOI Federal	0
	State	34
	City	6
	Other	24
Grand Total		748

FIRE SUPPRESSION EFFECTS: No dozer line, handline, or retardant was constructed/applied within LBVI critical habitat or known occurrence locations. Backfiring was conducted on the Harris Fire to protect lives and property, however maps and data on the locations of all backfire operations were not produced due to the intensity of the suppression effort. If backfire operations were conducted in LBVI habitat, which there is currently no data on, it is thought that the total acreage affected by this action was insignificant relative to the total amount of habitat lost or modified throughout the fire areas, across all ownerships.

EMERGENCY STABILIZATION EFFECTS: There are no negative effects expected from most proposed emergency stabilization treatments (see Specification Section for full details). Treatment for invasive weeds is being proposed in a small section of critical habitat to prevent the spread and establishment of invasive weeds and type conversion to non-native grassland habitats. Surveillance of this area will first be conducted to determine if herbicide application is needed. The use of herbicide is intended to provide short and long term beneficial effects to federally listed species by managing exotic and nuisance plant species. Application methods will be previously approved by the FWS-CFO and conducted in a manner not likely to adversely affect the listed species.

POST-FIRE POTENTIAL EFFECTS: There is expected to be an increase in flow and sedimentation within creeks supporting riparian vegetation. This may benefit the LBVI through the creation of alluvial deposits which will allow for the creation and expansion of riparian habitats across the flood plain. Scouring events will also create opening in established riparian zones to allow early successional species to grow, creating the dense understory utilized by LBVI. Increased flows and sedimentation in riparian areas could negatively impact the invertebrate prey base that LBVI forage on due to the degradation of water quality and potential changes in aquatic micro habitats. Through discussions with species experts, these impacts were working hypotheses which will require more supporting data to substantiate.

POST-FIRE OBSERVATIONS: LBVI were not observed during post fire reconnaissance. Vegetation within the riparian areas was observed to be re-sprouting approximately two weeks after the fire burn period.

SOUTHWEST WILLOW FLYCATCHER: The federally endangered southwest willow flycatcher is one of four subspecies of willow flycatchers in the U.S., with a breeding range including southern California, Arizona, New Mexico, southern Utah and Nevada, and western Texas (Hubbard 1987). Like the least Bell's Vireo, the SWFL is an obligate

riparian breeder, which has experienced declines due to habitat loss and cowbird parasitism (Schlorff 1990). Most breeding SWFL in San Diego County occur as single, isolated pairs.

The only critical habitat (approximately 21 acres) on DOI lands that was affected by the fires occurred on a BLM Tract within the Poomacha Fire. However, individual SWFL have not been detected within this critical habitat or within any DOI lands in the Poomacha Fire perimeter. Numerous detections have been made along the San Luis Rey Drainage, just outside of the eastern boundary of the Poomacha Fire on private lands. Species experts (B. Kus, USGS-BRD, pers. comm.) expect the SWFL to be present on Tribal Lands just downstream from this location, however access to these areas has been problematic and no surveys have been conducted.

DIRECT EFFECTS: SWFL migrate south in late summer and were not present when the fires burned.

INDIRECT EFFECTS: As stated above very little critical habitat acreage or areas of known species occurrence occur within the fire perimeters. Furthermore, most riparian areas throughout the fire perimeters experienced low vegetation mortality. Given these factors, indirect effects to the species should be negligible. Riparian habitat for this species may be improved in the long-term through the creation of earlier successional stages, which are preferred by this species. The potential exists, as outlined in the LBVI Indirect Effects section, for brown-headed cowbird parasitism to increase, as edges of riparian areas were opened up by the fire.

FIRE SUPPRESSION EFFECTS: No dozer line, handline, or retardant was constructed/applied within SWFL critical habitat or known occurrence locations. It is unknown if backfiring operations were conducted on the in SWFL habitats or occurrence areas, as maps and data on the locations of all backfire operations were not produced due to the intensity of the suppression effort. If backfire operations were conducted in SWFL habitat, which there is currently no data on, it is thought that the total acreage affected by this action was insignificant relative to the total amount of habitat lost or modified throughout the fire areas, across all ownerships.

EMERGENCY STABILIZATION EFFECTS: There are no negative effects expected from proposed emergency stabilization treatments (see Specification Section for full details).

POST FIRE FLOOD EFFECTS: Because SWFL is a riparian obligate species with a similar life history to LBVI, post fire flood effects will be similar. However, the SWFL has less critical habitat and is known to inhabit fewer areas within the fire perimeter.

There is expected to be an increase in flow and sedimentation within creeks supporting riparian vegetation. This may benefit the SWFL through the creation of alluvial deposits which will allow for the creation and expansion of riparian habitats across the flood plain. Scouring events will also create opening in established riparian zones to allow early successional species to grow, creating the dense understory utilized by SWFL. Increased flows and sedimentation in riparian areas could negatively impact the invertebrate prey base that SWFL forage on due to the degradation of water quality and potential changes in aquatic micro habitats. Through discussions with species experts, these impacts were working hypotheses which will require more supporting data to substantiate.

SENSITIVE SPECIES

The FWS and BLM have numerous species occurring within the fire area that are sensitive and occur within the Multiple Species Conservation Program (MSCP) plan area. Analysis into the effects of the fires, suppression impacts, and emergency stabilization treatments to these species is beyond the scope of this BAER Wildlife Assessment. BAER policy only allows for the stabilization of designated critical habitat and known species occurrence locations. However, given the local concern for impacts to these

species, sensitive species that may have been impacted by the fires should be studied to more accurately describe fire effects. Also, it should be noted that, though none of the below are federally listed, many species experts acknowledge that some are as imperiled as listed species. Agencies with jurisdiction over these species should work to assess fire effects in both the short and long term. Species of concern include coastal cactus wren, Harbison's dun skipper, Hermes copper, Thorne's hairstreak butterfly.

IV. RECOMMENDATIONS

Based on the results of the above observations:

D. Emergency Stabilization – Fire Suppression Repair

Rehabilitation of handline through Quino checkerspot butterfly and coastal California gnatcatcher habitat was completed under the supervision of Resource Advisors from the FWS-CFO. This effort will minimize impacts to QCB and CAGN habitats. No dozer line was constructed within any critical habitat or listed species known locations. Much of the dozer line outside of these areas was rehabilitated by suppression teams

E. Emergency Stabilization

1. T&E Habitat Stabilization/Recovery

Nearly 4500 and 3500 acres of critical habitat designated for the coastal California gnatcatcher and Quino checkerspot butterfly, respectively, was burned during the Harris, Witch, and Poomacha Fires. This is a significant piece of habitat representing a large number of species occurrence detections. Steps to stabilize these critical habitat areas are needed to prevent further degradation. Seeding with native forb and shrub seeds is being prescribed as an emergency stabilization measure on coastal California gnatcatcher (FWS lands) and Quino checherspot butterfly (FWS and BLM lands) critical habitats within the fire area (see Specifications FWS-5, FWS-6, and BLM-5). Seeding will speed the re-generation of these habitats and allow for quicker re-colonization by listed species. Prior to seeding, spot treatments of with herbicide will be conducted to combat invasive weeds (see Specifications FWS-3 and BLM-7). Both noxious weed control and seeding will help to prevent type conversion of coastal sage scrub habitat to earlier successional stage grasslands.

F. Management Recommendations – Non-Specification Related

BAER Team involvement in the Emergency Section 7 Consultations was concluded on 15 November 2007. For effects determinations of **no effect**, **may affect not likely to adversely effect**, and **not likely to adversely modify designated critical habitat**, agencies should send a copy of the Wildlife Assessment with a request for a letter of concurrence to the FWS-CFO.

FWS: The appropriate personnel should re-initiate Section 7 Emergency Consultation if further information becomes available regarding backfire operations and their effects on listed species. Prior to application of herbicide in CAGN and QCB critical habitat, measures provided by FWS-CFO to minimize the effects to listed species should be employed. If application follows the previously approved methods outlined by the FWS-CFO, these activities will not likely adversely affect the listed species or adversely modify designated critical habitat.

BLM: Prior to application of herbicide in CAGN and QCB critical habitat, measures provided by FWS-CFO to minimize the effects to listed species should be employed. If application follows the previously approved methods outlined by the FWS-CFO, these activities will not likely adversely affect the listed species or adversely modify designated critical habitat.

BIA: Avoidance and minimization measures for herbicide application within arroyo toad, least Bell's Vireo, and southwest willow flycatcher habitat were drafted by Kurt Roblek,

FWS-CFO on November 13, 2007 (see Supporting Documentation No. 42). If these measures are followed, results of application activities will not likely adversely affect the arroyo toad, least Bell's vireo, and southwest willow flycatcher or adversely modify designated critical habitat, and no further consultation will be needed on the matter. If the project to remove boulders from in front of culverts (VAR-JH14) deviates from the specification description, Section 7 Emergency Consultation should be re-initiated with the FWS-CFO.

The determinations documented in this assessment should be reassessed, and section 7 consultation reinitiated as needed, if additional emergency stabilization measures, or vegetation management activities are proposed after November 14, 2007. In non-emergency vegetation management activities are proposed for long-term rehabilitation and restoration of the fire area, another biological assessment should be prepared.

The 2007 southern California Fires provide a unique opportunity for agency biologists and scientific community to determine species and habitat responses to wildfire. Given the high level of interest regarding the effects of the fires to the federally listed and MSCP species, it seems prudent for biologist to collaborate on a list of questions to address identified concerns. The limited focus of the DOI BAER Team to address immediate treatments for federally threatened and endangered species occurring on DOI lands allowed only a cursory assessment of fire effects to the many other important species that contribute to the biodiversity of San Diego County. As assessment and study continues, if additional new information becomes available on the effects to federally listed species, agency biologists may re-assess the potential need for emergency treatments, with subsequent requests for Emergency Stabilization funding to treat emergency situations occurring on federal lands.

Research and Monitoring Needs: Short and long term effects to arroyo toad, Quino checkerspot butterfly, coastal California gnatcatcher, least Bell's vireo, southwest willow flycatcher and their habitats. Post-fire habitat use, population densities, and distribution of the above species should be the focus of research efforts. Effects of the fire to imperiled MSCP Sensitive Species should be monitored. The impacts of a short fire return interval to coastal sage scrub and chaparral habitats should be explored, with the description of management treatments to prevent type conversion of these habitats as a focus.

EFFECTS DETERMINATIONS FOR THREATENED AND ENDANGERED SPECIES

QUINO CHECKERSPOT BUTTERFLY

SUPPRESSION ACTION EFFECTS: Some habitat and individual larvae may have been lost during backfiring operations on the Harris Fire. This action affected a relatively small portion (<.1%) of their entire critical habitat area. It is thought that the total acreage affected by this suppression action was insignificant relative to the total amount of habitat lost or modified throughout the fire areas across all land ownerships. The backfire was set in an area with no recorded QCB detections. Approximately 1 mile of handline was cut on San Diego NWR within QCB habitat. This handline is approximately .33 acres in area and therefore represents a very small proportion of QCB habitat. Furthermore, the handline was rehabilitated under the supervision of Resource Advisors from the FWS-CFO. Because the total acreage that may have been affected by either the backfire or handline construction represents a very small percentage of the habitat affected by the fire and the total habitat available in San Diego County, the determination of effects for suppression actions for both FWS and BLM is **may effect, not likely to adversely affect the species or adversely modify designated critical habitat.**

EMERGENCY STABILIZATION EFFECTS: Treatment for invasive weeds is being proposed in critical habitat areas to prevent the spread and establishment of invasive weeds and type conversion to non-native grassland habitats. The use of herbicide is intended to provide short and long term beneficial effects to federally listed species by managing exotic and nuisance plant species. Application methods will be previously approved by the FWS-CFO and conducted in a

manner not likely to adversely affect the listed species. If application methods prescribed by FWS-CFO to minimize impacts to listed species are followed, the determination of effects for emergency stabilization actions for both FWS and BLM is **may effect, not likely to adversely affect the species or adversely modify designated critical habitat**.

ARROYO TOAD

FIRE SUPPRESSION EFFECTS: No dozer line, handline, backfiring operations or retardant drops were constructed/conducted within or adjacent to known arroyo toad occurrence locations. To date there were no known suppression activities that may have impacted the arroyo toad or their habitat, therefore the determination of effects for fire suppression actions for FWS, BLM, and BIA is **no effect**.

EMERGENCY STABILIZATION EFFECTS: Removal of boulders in front of culverts on the Rincon Reservation is necessary to protect lives and property. Implementation of this project should strictly follow the specification description to avoid adverse effects to arroyo toads. Treatment of invasive salt cedar, and arundo are being proposed adjacent to arroyo toad habitat in order to prevent further invasion and habitat degradation. The use of herbicide is intended to provide short and long term beneficial effects to federally listed species by managing exotic and nuisance plant species. Avoidance and minimization measures for herbicide application within arroyo toad habitat were provided by the FWS-CFO. If boulder removal does not deviate from specification description and application methods prescribed by FWS-CFO to minimize impacts to listed species are followed, the determination of effects for emergency stabilization actions for on BIA administered lands is **may effect, not likely to adversely affect**.

COASTAL CALIFORNIA GNATCATCHER

FIRE SUPPRESSION EFFECTS: Backfiring was conducted by suppression personnel to protect lives and property on SDNWR. This action affected a relatively small portion (<.1%) of their entire CAGN critical habitat area. It is thought that the total acreage affected by this suppression action was insignificant relative to the total amount of habitat lost or modified throughout the fire areas across all land ownerships. In addition, the backfire was set in an area with no recorded CAGN detections. Approximately 1 mile of handline was cut on San Diego NWR within CAGN habitat. This handline is approximately .33 acres in area and therefore represents a very small proportion of CAGN habitat. Furthermore, the handline was rehabilitated under the supervision of resource advisors from the FWS-CFO. Because the total acreage that may have been affected by either the backfire or handline construction represents a very small percentage of the habitat affected by the fire and the total habitat available in San Diego County, the determination of effects for suppression actions for FWS is **may effect, not likely to adversely affect the species or adversely modify designated critical habitat**.

EMERGENCY STABILIZATION EFFECTS: Treatment for invasive weeds is being proposed in critical habitat areas to prevent the spread and establishment of invasive weeds and type conversion to non-native grassland habitats. The use of herbicide is intended to provide short and long term beneficial effects to federally listed species by managing exotic and nuisance plant species. Application methods will be previously approved by the FWS-CFO and conducted in a manner not likely to adversely affect the listed species. If application methods prescribed by FWS-CFO to minimize impacts to listed species are followed, the determination of effects for emergency stabilization actions for FWS is **may effect, not likely to adversely affect the species or adversely modify designated critical habitat**.

LEAST BELL'S VIREO

FIRE SUPPRESSION EFFECTS: No dozer line, handline, or retardant was constructed/applied within LBVI critical habitat or known occurrence locations. Backfiring was conducted on the Harris Fire to protect lives and property, however maps and data on the locations of all backfire operations were not produced due to the intensity of the suppression effort. Therefore it is not known if backfire operations occurred in LBVI habitat. If backfire operations were conducted in LBVI habitat, it is thought that the total acreage affected by this action was insignificant relative to

the total amount of habitat lost or modified throughout the fire areas, across all ownerships. Because of this the determination of effects for suppression actions for FWS is **may effect, not likely to adversely affect the species or adversely modify designated critical habitat.**

EMERGENCY STABILIZATION EFFECTS: Treatment for invasive weeds is being proposed in a small section of critical habitat areas to prevent the spread and establishment of invasive weeds and type conversion to non-native grassland habitats. Surveillance of this area will first be conducted to determine if herbicide application is needed. If noxious weeds are detected treatment will commence. The use of herbicide is intended to provide short and long term beneficial effects to federally listed species by managing exotic and nuisance plant species. Application methods will be previously approved by the FWS-CFO and conducted in a manner not likely to adversely affect the listed species. If application methods prescribed by FWS-CFO to minimize impacts to listed species are followed, the determination of effects for emergency stabilization actions for FWS is **may effect, not likely to adversely affect the species or adversely modify designated critical habitat.**

SOUTHWEST WILLOW FLYCATCHER

FIRE SUPPRESSION EFFECTS: No dozer line, handline, or retardant was constructed/applied within SWFL critical habitat or known occurrence locations. Backfiring was conducted within fire areas to protect lives and property, however maps and data on the locations of all backfire operations were not produced due to the intensity of the suppression effort. Therefore it is not known if backfire operations occurred in SWFL habitat. If backfire operations were conducted in SWFL habitat, it is thought that the total acreage affected by this action was insignificant relative to the total amount of habitat lost or modified throughout the fire areas, across all ownerships. Because of this the determination of effects for suppression actions for FWS is **may effect, not likely to adversely affect the species or adversely modify designated critical habitat.**

EMERGENCY STABILIZATION EFFECTS: There are no emergency stabilization treatments being proposed in SWFL critical habitat or known occurrence locations. Because of this the determination of effects for emergency stabilization actions is **no effect.**

V. CONSULTATIONS

The following people participated in post fire reconnaissance, data collection and analysis, and developing the information included in this assessment.

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BURNED AREA EMERGENCY STABILIZATION PLAN

2007 SOCAL FIRES

APPENDIX II COMPLIANCE

APPENDIX II - ENVIRONMENTAL COMPLIANCE

FEDERAL, STATE, AND PRIVATE LANDS ENVIRONMENTAL COMPLIANCE RESPONSIBILITIES

All projects proposed in the 2007 SoCal Fires Burned Area Emergency Response Plan (2007 BAER Plan) that are prescribed, funded, or implemented by Federal agencies, regardless of the jurisdiction of the lands on which the project occur, must comply with the National Environmental Policy Act (NEPA). The assessment of project conformance with NEPA (42 U.S.C. 4321 et. seq.) is conducted in accordance with the Council on Environmental Quality Regulations (40 CFR 1500-1508), Department of the Interior Manual (516 DM 1 – 7), the Bureau of Land Management (BLM) Handbook (H-1790-1) and the U.S. Fish and Wildlife Service (USFWS) NEPA Reference Handbook. Additional policy and directives that specifically describe compliance requirements for prescribed emergency stabilization and monitoring actions was also consulted.

LEGAL FRAMEWORK FOR THE DOI BAER PROGRAM

The Watershed Protection and Flood Control Act (1954, as amended 1956-1997) committed the federal government to the protection of the country's watersheds and created the Natural Resources Conservation District. Recognizing that "Erosion, floodwater, and sediment damages" cause "...loss of life and damage to property", the federal government, in cooperation with States, local government, and special districts should work to prevent these damages while "preserving, protecting, and improving the Nation's land and water resources and the quality of the environment. (16 USC Sec. 1001)

The Wyden Amendment, added to the Act in 1996, gave the Department of the Interior (DOI) land management agencies and the USFS the authority to use cooperative agreements for emergency stabilization in order to protect, restore and enhance "resources on public or private land and the reduction of risk from natural disaster where public safety is threatened on public lands." (16 USC 1011). When emergency stabilization funds are used under the Wyden Authority, treatments must meet the same criteria for emergency stabilization appropriateness and timelines as emergency stabilization treatments on federal lands. Appropriate cost-sharing protection and liability agreements should be included in the cooperative agreement with the land owner. A cooperative agreement must be signed and in place prior to commencement of any work on those private or non-federal lands. The Wyden Amendment sunsets in 2011.

RELATED PLANS

The 2007 BAER Plan was reviewed for consistency with relevant plans and policies of neighboring jurisdictions. The planning area is comprised of lands managed by the DOI, including Tribal Trust Lands, which were impacted by the Poomacha, Witch, and

Harris fires. The impacted federal lands are managed by the Southern California Agency (BIA), San Diego National Wildlife Refuge (USFWS), and the Palm Springs-South Coast Field Office (BLM) and non-federal lands within San Diego County. Land management plans relevant to providing NEPA compliance are summarized below.

BIA, Southern California Agency Fire Management Plan, October 2000

The purpose of the Southern California Agency Fire Management Plan (SCA FMP) is to aid the agency and associated tribes in addressing “tribal goals and objectives, the ecological role of wildland fire, values to be protected, preparedness, prevention, interagency mobilization, strategies for appropriate management responses to wildland fire, hazardous fuels management and prescribed fire use, and emergency rehabilitation of burned areas.”(FIREWISE, 2000, p.2). The SCAFMP complies with Federal Wildland Fire Policy which requires that all federally-managed lands with burnable vegetation have a fire management plan meeting current federal standards (DOA 2001; NIFC 2001).

The 2007 BAER Plan is in conformance with the SCA FMP and helps the Southern California Agency meet the following specific goals of the SCA FMP:

- Protect life and property, cultural and ceremonial sites, and natural resources from the threat of wildland fire.
- Provide gainful employment opportunities for tribal members.
- Develop and implement a fire prevention program/plan to protect life, property, cultural resources, and natural resources (FIREWISE, 2000, p. 3).

The 2007 BAER Plan fulfills the requirement for federal land managers to immediately rehabilitate burned areas to prevent loss of life and/or property and reduce potential negative impacts to critical resources as a result of fire effects or fire suppression activities (NIFC 2001). The SCA FMP directs the Agency Superintendent to initiate approved BAER activities to prevent unacceptable resource degradation and minimize threats to life and property resulting from wildland fire (FIREWISE, 2000, p. 26). The SCA FMP directs that ordering the National BAER Team is an option for larger, more complex fires which exceed the capability of the local team (FIREWISE, 2000, p. 27).

Tribal lands affected by the 2007 SoCal fires are grouped within two of five fire planning zones in the SCA FMP. The Inland Mountain Zone includes La Jolla, Mesa Grande, Pala, Pauma, Yuima, Inaja, Rincon and San Ysabel reservations. The San Diego County Coastal Mountain Zone includes Barona, Jamul and Capitan Grande reservation. A discussion of values to be protected in these two zones directs the SCA to:

- place a high value on water quality and quantity impacts,
- ensure that visual impacts from ground disturbing suppression actions are kept to an acceptable level,
- plan projects to avoid or mitigate any adverse impacts to documented and found archaeological features,

- consult with cultural resource surveys to identify the location of any known sites within or immediately adjacent to project boundaries for all projects involving ground disturbance,
- flag or otherwise identify any known archaeological site boundaries prior to beginning projects (FIREWISE, 2000, pages 65 - 66 and 76 – 78).

USFWS, San Diego National Wildlife Refuge Wildland Fire Management Plan, 2004

The San Diego National Wildlife Refuge Complex Wildland Fire Management Plan (Refuge FMP) provides programmatic and operational guidance to the US Fish and Wildlife Service (USFWS) for managing the wildland fire and fuels management programs, consistent with federal Wildland Fire Management Policy, National Wildlife Refuge System goals and specific goals of the San Diego National Wildlife Refuge Complex. The USFWS lands addressed in the 2007 BAER Plan are in the San Diego National Wildlife Refuge, one of four refuges in the Refuge Complex addressed in the Refuge FMP. The 2007 BAER Plan conforms to many of the goals set for the San Diego National Wildlife Refuge Complex in the Refuge FMP:

- To protect, restore and enhance native habitats to aid in the recovery of federally listed endangered and threatened species and to prevent the listing of additional species
- To protect, manage, and restore the rare coastal sage scrub, chaparral, riparian woodland, vernal pools, coastal dune and wetland habitats representative of the biological diversity of the southwestern San Diego region
- To provide safe high quality opportunities for compatible wildlife dependent educational and recreational activities that foster public appreciation of the unique natural heritage of the San Diego region for the conservation of native coastal scrub, chaparral, grassland, vernal pool, and riparian communities, recovery of several endangered and threatened species, and the protection of biological diversity (USFWS 2004, p. 6).

The 2007 BAER Plan also meets several of the fire management objectives of the Refuge FMP:

- Implement pre-suppression, suppression, and post-suppression activities that maintain or enhance the current biological communities, and prevent adverse impacts on resources consistent with completing the fire protection mission.
- Enhance or restore native plant communities and benefit other resources of the biological community that have been reduced or degraded by human-caused factors, including increased fire frequency.
- Identify fire return intervals and identify effects upon various plant communities to assist in the development of future management actions, which may include

prescribed burning. The goal is to restore optimal fire regimes for habitat and watershed management.

- Protect life, property, and resources from wildland fire.
- Develop and implement a process to ensure collection, analysis and application of high quality fire management information needed for sound management decisions (USFWS 2004, p. 6 - 7).

The Refuge FMP uses the term “Burned Area Emergency Stabilization and Rehabilitation Plan (ESR)” in place of the currently used term “BAER” to when referring to post-fire emergency stabilization efforts. As used in the Refuge FMP, the terms ESR and BAER are essentially interchangeable. The goal of a BAER effort is “to protect public safety and stabilize and prevent further degradation of natural and cultural resources, and to rehabilitate the stability, productivity, diversity, and ecological integrity of refuge lands after a wildland fire as described in approved refuge management plans (USFWS 2004, p. 59). According to the Refuge FMP, a BAER Plan would tier from the FMP and Comprehensive Conservation Plan for the Complex (CCP). In this instance, however, the 2007 BAER Plan is addressed by an EA while the FMP met the requirements for a Categorical Exclusion from further NEPA analysis. As an EA has a broader scope of analysis than a CE, tiering would not be appropriate.

BLM, South Coast Resource Management Plan and Record of Decision, 1994

The BLM South Coast Resource Management Plan and Record of Decision (BLM RMP) provides land use and management direction for BLM lands within the Palm Springs-South Coast Field Office within San Diego County. Though the BLM RMP does not address post-fire emergency stabilization, a number of land use decisions identified in the RMP are relevant to the 2007 BAER Plan, including:

- BLM will continue to avoid jeopardizing the existence of any federally listed or state-listed or proposed species, and will actively promote species recovery and work to continue to improve the status of candidate and sensitive species
- Measures for minimizing accelerated soil erosion will continue to be made on a site-specific basis through evaluation of management actions.
- All management actions will comply with the National Historic Preservation Act of 1966.

Resource condition objectives were identified that also have relevance to this BAER plan, including:

- Emphasize protection and enhancement of sensitive species habitat and open space values
- Enhance habitats for all wildlife species

- Provide opportunities for low-impact recreation through provision of facilities and services.

The management goals below are from the 1994 South Coast Resource Management Plan for the Border Mountains area:

1. Special status species habitat and open space values are protected and enhanced.
2. Habitats for game species, including deer and quail, are improved.
3. Native American values associated with Kuchamaa (Tecate Peak) are protected through coordination with local tribes.
4. Recovery of federal- and state-listed species is improved through ensuring consistency with Habitat Conservation Plans and the guidelines for the NCCP.
5. Management effectiveness within the planning area is improved through consolidation of BLM public land ownership.
6. Recreational opportunities are provided on public lands with an emphasis on low impact recreation activities.
7. The mission specific goals of other agencies are met, to the legal extent feasible, through close coordination and by maintaining administrative access across public lands for fire protection/suppression, wildlife management, emergency services, and national security.
8. Cross border coordination for cultural and natural resource management is promoted and improved.

Treatments in this 2007 SoCal BAER Plan are considered to be in conformance with the 1994 South Coast Resource Management Plan.

***Proposed Otay-Sweetwater Unit of the San Diego National Wildlife Refuge
Environmental Assessment (EA) and Land Protection Plan, 1997***

This Refuge EA evaluated planning alternatives and assessed the effects of establishing a Refuge through acquisition of the lands comprising the Otay-Sweetwater Unit of the San Diego National Wildlife Refuge. The alternatives were variations of the Refuge boundary. The issues surrounding wildland fire hazard were not identified as significant, relevant issues for assessment in the EA. Wildland fires and the increase in frequency in wildland fires were noted in the EA as a great concern to surrounding landowners of the Unit. The EA states that the establishment of the Refuge would not increase the likelihood of fire and the issue was dismissed from further analysis in the EA. Wildland fire was also discussed in relation to illegal immigration, another issue that was not selected for detailed analysis, as the establishment of the Refuge would not significantly alter existing patterns of illegal immigration. The EA stated that fire

management would be specifically addressed in a subsequent fire management plan developed by the Refuge Fire Management Officer.

The Refuge EA serves as the land use planning document for the Refuge until the USFWS completes the San Diego Wildlife Refuge Comprehensive Conservation Plan (CCP) which is currently in the early stages of the planning and NEPA process. A Comprehensive Conservation Plan and Environmental Impact Statement (EIS) are being developed; a draft list of EIS alternatives is currently being circulated for internal agency review prior to presentation to the public (V. Touchstone, pers. comm.)

EA for “Herbicide application & drill seeding Burned Area Emergency Stabilization – Otay Fire”, EA # CA-660-04-26, BLM Palm Springs-South Coast Field Office, 2004

The EA analyzed the potential impacts of implementing one of the 2003 BAER Plan specifications for BLM lands within the Otay Fire. NEPA compliance for the specifications in the 2003 BAER Plan was included in Appendix II of the Plan. Specification V-3, Invasive Species Control, called for herbicide applications to control non-native invasive plants on approximately 267 acres of BLM lands and rangeland drill seeding on 250 of those same acres. The Decision Record approved the use of the herbicide Glyphosate Pro to control invasive species and a mix of native species for seeding. The plants in the seed mix were a mix of fast-growing annuals to compete against invasive species or legumes that fix nitrogen, plants that serve as hosts for mycorrhizal fungi, others that benefit the federally-endangered Quino checkerspot butterfly by providing nectar or serving as a host plant. Similar restoration actions are proposed for BLM lands in the 2007 BAER Plan.

Final Multiple Species Conservation Program Multiple Species Conservation Plan (MSCP) and County of San Diego Subarea Plan, 1998

The MSCP is a multi-jurisdictional, multi-species habitat conservation plan developed in conformance with the 1992 Natural Communities Conservation Planning Act (NCCP). The NCCP was the first large-scale conservation planning effort in the United States and focused on protection of the remaining coastal sage scrub habitat, home to the federally-threatened California gnatcatcher and 85 other rare or listed plant and animal species. The NCCP planning area, divided into 11 subareas, is roughly 6,000 square miles and includes all or part of five southern California counties. The objective of the NCCP is to provide conformance with the federal Endangered Species Act, conserve natural communities at the ecosystem scale and accommodate a set level of new development. The goal of the MSCP, the first subarea plan to be adopted under the NCCP, is to maintain and enhance biological diversity and conserve viable populations of listed species, so as to prevent local extirpation. When fully implemented, the MSCP would preserve 172,000 acres out of the total 582,000 acres covered by the plan.

In supporting the goals and objectives of the DOI agencies (USFWS and BLM) as demonstrated in the previous discussion, the 2007 BAER Plan furthers the objectives of the MSCP to which these agencies subscribe. A goal of the Refuge is to:

“create partnerships and provide leadership in coordinating the land management activities of Federal, Tribal, State and local governments and agencies and with academia, private conservation organization and citizens in support of the Multiple Species Conservation Program preserve system (USFWS 2004, p. 6.”

The MSCP does not specifically address emergency stabilization following wildland fire in its guidelines for preserve management but does call for each preserve to have fire management plans developed by fire professionals. The County’s Subarea Plan, which describes the management framework for the County’s portion of the MSCP, prohibits ground disturbance within MSCP lands with a few exceptions, one of which is “Activities required to be conducted pursuant to a revegetation, habitat management, habitat restoration, recovery program”. The Subarea Plan sets as top management priorities the restoration of native species, removal of exotic species and the maintenance of drainages and channels.

CUMULATIVE IMPACT ANALYSIS

Cumulative effects are the environmental impacts resulting from the incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions. For this analysis, cumulative impacts are limited to the total effect of all treatments proposed in this BAER Plan, but this analysis does not consider all other Federal or Non-Federal actions that may occur in the project areas beyond the scope of BAER. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. The emergency stabilization treatments for areas affected by the 2007 SoCal Fires, as proposed in the 2007 SoCal Fires BAER Plan, do not result in an intensity of impact (i.e. major ground disturbance, etc.) that would cumulatively constitute a significant impact on the quality of the environment. The treatments are consistent with the above jurisdictional management plans and associated environmental compliance documents and categorical exclusions listed below.

APPLICABLE AND RELEVANT CATEGORICAL EXCLUSIONS

Many of the individual actions (also referred to as projects or treatments) proposed in this plan for the 2007 SoCal fires meet the requirements to be Categorically Excluded from further environmental analysis as provided for in:

- Department of the Interior Categorical Exclusions: 516 DM 2.3(A) and 516 DM 2, Appendix 1, (6/21/2005),
- U.S. Fish and Wildlife Categorical Exclusions: 516 DM 8.5 (5/27/2004),
- Bureau of Indian Affairs: 516 DM 10.5 (5/27/2004)

- Bureau of Land Management: 516 DM 11.5 (5/27/2004)¹.

All applicable and relevant Department and Agency Categorical Exclusions are listed below. Categorical Exclusion decisions were made with consideration given to the results of required emergency consultations completed by the Burned area emergency response team and documented below.

Applicable Department of the Interior Categorical Exclusions (Appendix 1 of 516 DM 2):

- 1.6 Nondestructive data collection, inventory (including field, aerial, and satellite surveying and mapping), study, research, and monitoring activities.
- 1.13 Post-fire rehabilitation activities not to exceed 4,200 acres (such as tree planting, fence replacement, habitat restoration, heritage site restoration, repair of roads and trails, and repair of damage to minor facilities such as campgrounds) to repair or improve lands unlikely to recover to a management approved condition from wildland fire damage, or to repair or replace minor facilities damaged by fire. Such activities: Shall be conducted consistent with agency and Departmental procedures and applicable land and resource management plans; Shall not include the use of herbicides or pesticides or the construction of new permanent roads or other new permanent infrastructure; and Shall be completed within three years following a wildland fire. (Refer to the Environmental Statement Memoranda Series for additional, required guidance.)

Applicable BIA Southern California Agency Categorical Exclusions (516 DM 10):

- A Operation, Maintenance, and Replacement of Existing Facilities.
- H(6) Approval of emergency forest and range rehabilitation plans when limited to environmental stabilization on less than 10,000 acres and not including approval of salvage sales of damaged timber.
- L(4) Installation of fencing, signs, pavement markings, small passenger shelters, traffic signals, and railroad warning devices where no substantial land acquisition or traffic disruption will occur.
- M(1) Data gathering activities such as inventories, soil and range surveys, timber cruising, geological, geophysical, archeological, paleontological and cadastral surveys.

Applicable USFWS, San Diego National Wildlife Refuge Categorical Exclusions (516DM 8):

¹ Five categorical exclusions added by the Energy Policy of 2005 for oil and gas exploration do not apply to BAER actions.

- B(1) Research, inventory, and information collection activities directly related to the conservation of fish and wildlife resources which involve negligible animal mortality or habitat destruction, no introduction of contaminants, or no introduction of organisms not indigenous to the affected ecosystem.
- B(2) The operation, maintenance, and management of existing facilities and routine recurring management activities and improvements, including renovations and replacements which result in no or only minor changes in the use, and have no or negligible environmental effects on-site or in the vicinity of the site.
- B(3) The construction of new, or the addition of, small structures or improvements, including structures and improvements for the restoration of wetland, riparian, instream, or native habitats, which result in no or only minor changes in the use of the affected local area. The following are examples of activities that may be included.
 - (a) The installation of fences.
 - (b) The construction of small water control structures.
 - (c) The planting of seeds or seedlings and other minor revegetation actions.
 - (d) The construction of small berms or dikes.
 - (e) The development of limited access for routine maintenance and management purposes.

Applicable Bureau of Land Management Categorical Exclusions 516 (DM 11):

- G(4) Placement of recreational, special designation or information signs, visitor registers, kiosks and portable sanitation devices
- H(8) Installation of minor devices to protect human life (e.g., grates across mines).

Statement of Compliance for the 2007 SoCal Fires BAER Plan

This section documents consideration given to the requirements of specific environmental laws in the development of the 2007 SoCal Fires Burned Area Emergency Response Plan. Specific consultations initiated or completed during development and implementation of this plan are also documented. The following executive orders and legislative acts have been reviewed as they apply to the 2007 SoCal Fires Burned Area Emergency Response Plan:

National Historic Preservation Act (NHPA) – BAER Archeologist Dan Hall contacted Milford Wayne Donaldson, FAIA California State Historic Preservation Officer, to advise the SHPO that the National Interagency BAER Team was preparing an Emergency Stabilization (ES) plan to address post-fire effects that may result from the Poomacha, Witch and Harris fires. It was conveyed to Mr. Donaldson

that the ES plan may contain treatments that could potentially affect Historic Properties. In that event, it was communicated to Mr. Donaldson that the lead agencies on the incident (BIA, BLM and USFWS) would fully comply with Section 106 of the National Historic Preservation Act, as amended and under its implementing regulations as provided under 36 CFR Part 800

Executive Order 11988: Floodplain Management – No proposed treatments would occupy or modify floodplains and all proposed treatments are in compliance with this order.

Executive Order 11990: Protection of Wetlands – No proposed treatments would result in long-term impacts to or loss of wetlands and all proposed treatments are in compliance with this order.

Executive Order 12372: Intergovernmental Review – Coordination and consultation is ongoing with affected Tribes, Federal, State, and local agencies. A copy of the plan will be disseminated to all affected agencies.

Executive Order 12892: Federal Actions to Address Environmental Justice in Minority and Low-income Populations – The actions proposed in this plan would result in no adverse human health or environmental effects for minority or low-income populations and Indian Tribes.

Endangered Species Act – Section 7 Consultation: The BAER Team Wildlife Biologist contacted Kurt Roblek, USFWS Wildlife Biologist, Carlsbad Office, on October 29, 2007 to begin Endangered Species Act Section 7 consultation for SoCal BAER Plan treatments proposed for the reservations or BLM lands. ESA conformance for treatments proposed for the San Diego Wildlife Refuge is the responsibility of the Manager of that refuge. The BIA, BLM and USFWS will each follow-up on consultation and ESA conformance during BAER implementation, if warranted by changes to the proposed treatments, and for post-fire rehab activities as required by the ESA. Based on the findings of the environmental analysis conducted in conformance with NEPA and informal consultation under the ESA, we do not anticipate adverse effects to federally-listed species from implementing the 2007 SoCal BAER Plan. The primary species of concern that were identified for consideration in consultation are: San Diego thorn-mint, San Diego ambrosia, Otay tarplant, willow monardella, prostrate navarretia, Arroyo toad, Southwestern willow flycatcher, Coastal California gnatcatcher, and Least Bell's vireo.

Clean Water Act: With the possible exception of the reservoir bank repair and channel clearing, all proposed treatments are in compliance with the CWA and long-term impacts are considered beneficial to water quality. Emergency permits were submitted to the Army Corps of Engineers for compliance with Section 404 of the CWA, with the expectation that the projects would qualify for a nationwide permit 37 for emergency actions and the end result would be an improvement to the stability of the reservoir and removal of the debris and tire hazard in the unnamed channel to Pauma Creek that threatens downstream housing.

Clean Air Act: Implementation of treatments proposed in this plan may result in short-term localized impacts to air quality due to equipment emissions and/or increases in particulates during ground based activities. However, stabilization of the burned watershed would have long-term beneficial effects on water quality by reducing the potential for soil erosion.

CONSULTATIONS

BAER Team members went to a heavily-attended public meeting at the Rincon Tribal Hall on October 30, 2007 where leaders from tribes affected by the Harris, Witch and Poomacha fires. Each tribal leader spoke to the effects of the fires on their people, lands and property. The BAER Team Leader and numerous governmental and NGO aide agencies explained what services each could offer to the tribal members. BAER team staff noted all issues raised during the meeting.

Internal scoping was continued daily by the BAER Team at each evening briefing when new issues found in the field were recorded into the record of issues and concerns. Issues and concerns were brought up by agency representatives throughout the BAER process.

The following government agencies/tribes were consulted in the development of the 2007 SoCal Fires BAER Plan.

- Barona Indian Reservation
- Capitan Grande Indian Reservation
- Inaja Cosmit Indian Reservation
- Mesa Grande Indian Reservation
- Santa Ysabel Indian Reservation
- Rincon Indian Reservation
- La Jolla Indian Reservation
- Pala Indian Reservation
- Pauma-Yuima Indian Reservation
- San Pasqual Indian Reservation
- Bureau of Indian Affairs
- Bureau of Land Management
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- California Department of Fire and Forest Protection
- San Diego County
- U.S. Army Corps of Engineers
- California State Historic Preservation Office

SAN DIEGO NATIONAL WILDLIFE REFUGE COMPLIANCE SUMMARY FOR 2007 SOCIAL FIRES BAER PLAN

	Treatment or Action	NEPA documentation (EIS, EA, or Cat Ex)	Reference to Assessment	Findings of Significance
1	Plan Preparation	N/A	N/A	N/A
2	Implementation Leader	N/A	N/A	N/A
3	Invasive Weed Treatment	EA	Vegetation	No significant impact
4	Monitor Critical Habitat Treatments	CE: USFWS B.1	Vegetation	No significant impact
5	Seeding Critical Habitat_CGN	EA	Vegetation	No significant impact
6	Seeding Critical Habitat_QCB	EA	Vegetation	No significant impact
7	Herbicide Treatment	EA	Vegetation	No significant impact
8	Tree Hazard Mitigation	CE: DOI 1.13	Vegetation	No significant impact
9	Protective Fence	CE: USFWS B. 3 (a)	Vegetation	No significant impact, pending NHPA 106
10	Remove Interior Fence	CE: USFWS B.2	Vegetation	No significant impact
11	Replace Boundary Fence	CE: DOI 1.13	Vegetation	No significant impact
12	Replace Boundary/Closures signs	CE: USFWS B.2	Public Safety and Utilities	No significant impact
13	Construct Asphalt Water Bar	CE: DOI 1.13	Soil and Watershed	No significant impact
14	Place Road Drain Outlets	CE: DOI 1.13	Soil and Watershed	No significant impact
15	Flood Hazard Signs	CE: USFWS B.2	Soil and Watershed	No significant impact
16	Spillway Repair	CE: USFWS B.2	Soil and Watershed	No significant impact
17	Road Re-contouring	CE: USFWS B.2	Soil and Watershed	No significant impact
18	Road Maintenance/Debris Removal	CE: USFWS B.2	Soil and Watershed	No significant impact
19	Repair RAWs	CE: DOI 1.13	Public Safety and Utilities	No significant impact
20	Replace Suppression Water System	CE: DOI 1.13	Public Safety and Utilities	No significant impact
21	Replace Repeater	CE: USFWS B.2	Public Safety and Utilities	No significant impact
22	Replace Safety Signs/Guardrails	CE: USFWS B.2	Public Safety and Utilities	No significant impact

BLM Border Mountains Area Compliance Summary for 2007 SoCal fires BAER plan

#	Treatment or Action	NEPA documentation (EIS, EA, or Cat Ex)	Reference to Assessment	Findings of Significance
1	Plan Preparation	N/A	N/A	N/A
2	Implementation Leader	N/A	N/A	N/A
3	Mine and Well Safety	CE: BLM H8	Public Safety and Utilities	No significant impact; pending NHPA 106
4	Habitat Closure Signs	CE: BLM G.4	Public Safety and Utilities	No significant impact
5	Critical Habitat Seeding	EA	Vegetation	No significant impact
6	Invasive Species Assessment	CE: DOI 1.6	Vegetation	No significant impact
7	Invasive Weed Treatment	EA	Vegetation	No significant impact
8	Protective Fence	CE: DOI 1.13	Vegetation	No significant impact, pending NHPA 106
9	Seeding Effectiveness Monitoring	CE: DOI 1.6	Vegetation	No significant impact
10	Treatment Effectiveness Monitoring	CE: DOI 1.6	Vegetation	No significant impact
11	Flood Hazard Signs	CE: BLM G.4	Soil and Watershed	No significant impact

Bureau of Indian Affairs Compliance Summary for 2007 SoCal Fires BAER Plan

#	Treatment or Action	NEPA documentation (EIS, EA, or CE)	Reference to Assessment	Findings of Significance
1	Plan Preparation	N/A	N/A	N/A
2	Implementation Leader	N/A	N/A	N/A
3	Power Poles/Lines Replacement	CE BIA A.	Public Safety and Utilities	No significant impact
4	Arch. Site Protection	CE DOI 1.13	Cultural	No significant impact
5	Arch. Site Stabilization	CE DOI 1.13	Cultural	No significant impact
6	Invasive Species Assessment	CE BIA M.1	Vegetation	No significant impact
7	Weed Treatment Monitoring	CE BIA M.1	Vegetation	No significant impact
8	Invasive Weeds Treatments	EA	Vegetation	No significant impact
9	Protective Fencing	CE BIA L.4	Vegetation	No significant impact
10	Tree Hazard Identification	CE BIA H.6	Vegetation	No significant impact
11	Tree Hazard Mitigation	CE BIA H.6	Vegetation	No significant impact
12	Maintain Sediment Basin	CE BIA A.	Soil and Watershed	No significant impact
13	Guardrail Repair and Traffic Signs	CE DOI 1.13	Public Safety and Utilities	No significant impact
14	Flood Hazard Signs	CE BIA L.4	Soil and Watershed	No significant impact
15	Sandbag UV Protection	CE BIA H.6	Soil and Watershed	No significant impact
16	Structure Protection	CE BIA H.6	Soil and Watershed	No significant impact
17	Bank Stabilization	CE DOI 1.13	Soil and Watershed	No significant impact
18	Channel Debris Cleanout	EA	Soil and Watershed	No significant impact
19	Culvert Cleaning	CE DOI 1.13	Soil and Watershed	No significant impact
20	Culvert/Removal Replacement	CE DOI 1.13	Soil and Watershed	No significant impact
21	Early Warning System	CE DOI 1.13	Soil and Watershed	No significant impact
22	Interception Ditch Cleaning	CE DOI 1.13	Soil and Watershed	No significant impact
23	Irrigation Ditch Maintenance	CE DOI 1.13	Soil and Watershed	No significant impact
24	Low Water Crossing	CE DOI 1.13	Soil and Watershed	No significant impact
25	Road Debris Removal	CE DOI 1.13	Soil and Watershed	No significant impact
26	Water System Assessment	CE DOI 1.13	Soil and Watershed	No significant impact

DOI EXCEPTIONS TO CATEGORICAL EXCLUSIONS

The CEQ Regulations at 40 CFR 1508.4 require agencies to consider whether fairly routine actions involve extraordinary circumstances that, per NEPA, trigger an agency to prepare additional assessment and consideration. If it is determined that any of the exceptions listed in the table below apply to a proposed action, that action may not be categorically excluded, and an EA or an EIS must be prepared. The list below is a Department of the Interior list that applies to all DOI agencies (516 DM 2, Appendix 2); agencies often have additional items on their own list. of Departmental exceptions, appendix 2). All treatments proposed for Tribal, USFWS, or BLM lands have been compared against the list of Extraordinary Circumstances listed below and were found not to trigger any exceptions.

Yes	No	Extraordinary Circumstance. Would this action...
	X	2.1 Have significant impacts on public health or safety?
	X	2.2 Have significant impacts on such natural resources and unique geographic characteristics as historic or cultural resources; park, recreation or refuge lands; wilderness areas; wild or scenic rivers; national natural landmarks; sole or principal drinking water aquifers; prime farmlands; wetlands (Executive Order 11990); floodplains (Executive Order 11988); national monuments; migratory birds; and other ecologically significant or critical areas?
	X	2.3 Have highly controversial environmental effects or involve unresolved conflicts concerning alternative uses of available resources [NEPA Section 102(2)(E)]?
	X	2.4 Have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks?
	X	2.5 Establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects?
	X	2.6 Have a direct relationship to other actions with individually insignificant but cumulatively significant environmental effects?
	X*	2.7 Have significant impacts on properties listed, or eligible for listing, on the National Register of Historic Places as determined by either the bureau or office?
	X	2.8 Have significant impacts on species listed, or proposed to be listed, on the List of Endangered or Threatened Species, or have significant impacts on designated Critical Habitat for these species?
	X	2.9 Violate a Federal law, or a State, local, or tribal law or requirement imposed for the protection of the environment?
	X	2.10 Have a disproportionately high and adverse effect on low income or minority populations (Executive Order 12898)?
	X	2.11 Limit access to and ceremonial use of Indian sacred sites on Federal lands by Indian religious practitioners or significantly adversely affect the physical integrity of such sacred sites (Executive Order 13007)?
	X	2.12 Contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area or actions that may promote the introduction, growth, or expansion of the range of such species (Federal Noxious Weed Control Act and Executive Order 13112)?

* pending completion of NHPA 106 compliance as per specifications BLM # 3, "Mine and Well Safety", BLM #8, "Protective Fence" , and FWS #9 "Protective Fence".

EXCEPTION CHECKLIST FOR BIA CATEGORICAL EXCLUSIONS

Project: 2007 SoCal Fires Burned Area Emergency Response Plan

Date: November 14, 2007

Nature of Action: Several actions are proposed for implementation on the Rincon, La Jolla, Pala, Pauma, Mesa Grande, Inaja Cosmit, Barona, Capitan Grande, San Pasqual, and Santa Ysabel Reservations to provide for emergency stabilization of tribal lands following the 2007 southern California fires. These actions, as described in the discipline assessment specifications within the 2007 SoCal Fires BAER plan, meet Department of Interior or Bureau of Indian Affairs definitions as a Categorical Exclusion under NEPA. Refer to the "Bureau of Indian Affairs Compliance Summary for the 2007 SoCal Fires BAER Plan" for the treatments and applicable NEPA documentation for them; all the Categorical Exclusions that apply to the 2007 SoCal BAER Plan for tribal lands are listed below.

516 DM 10.5

Categorical Exclusions Applied to BIA BAER Treatments

- A. Operation, Maintenance, and Replacement of Existing Facilities. Examples are normal renovation of buildings, road maintenance and limited rehabilitation of irrigation structures.
- H(6) Forestry: Approval of emergency forest and range rehabilitation plans when limited to environmental stabilization on less than 10,000 acres and not including approval of salvage sales of damaged timber.
- L(4) Roads and Transportation: Installation of fencing, signs, pavement markings, small passenger shelters, traffic signals, and railroad warning devices where no substantial land acquisition or traffic disruption will occur.
- M(1) Other: Data gathering activities such as inventories, soil and range surveys, timber cruising, geological, geophysical, archeological, paleontological and cadastral surveys.

516 DM 2, Appendix 1

- 1.13 Post-fire rehabilitation activities not to exceed 4,200 acres (such as tree planting, fence replacement, habitat restoration, heritage site restoration, repair of roads and trails, and repair of damage to minor facilities such as campgrounds) to repair or improve lands unlikely to recover to a management approved condition from wildland fire damage, or to repair or replace minor facilities damaged by fire. Such activities: Shall be conducted consistent with agency and Departmental procedures and applicable land and resource management plans; shall not include the use of herbicides or pesticides or the construction of new permanent roads or other new permanent infrastructure; and shall be completed within three years following a wildland fire. (Refer to the Environmental Statement Memoranda Series for additional, required guidance.)

Evaluation of Exceptions to use of Categorical Exclusion:

#	Would this action.....	No	Yes
1.	have significant adverse effects on public health or safety?	X	
2.	have an adverse effect on unique geographical features such as wetlands, wild or scenic rivers, refuges, floodplain, rivers placed on nationwide river inventory, or prime or unique farmlands?	X	
3.	have highly controversial environmental effects?	X	
4.	have highly uncertain environmental effects or involve unique or unknown environmental risk?	X	
5.	establish a precedent for future actions?	X	
6.	in relation to other actions have individually insignificant but cumulatively significant environmental effects?	X	
7.	affect properties listed or eligible for listing in the National Register of Historic Places?	X	
8.	affect a species listed or proposed to be listed as endangered or threatened?	X	
9.	threaten to violate federal, state, local, or tribal law or requirements imposed for protection of the environment?	X	
10.	have a disproportionately high and adverse effect on low income or minority populations?	X	
11.	will limit access to, and ceremonial use of Indian sacred sites on federal lands by Indian religious practitioners, or significantly adversely affect the physical integrity of such sacred sites?	X	
12.	contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area, or may promote the introduction, growth, or expansion of the range of such species?	X	

A “yes” to any of the above exceptions will require that an EA be prepared.

NEPA ACTION: CE X EA

Preparer's Name and Title: /s/Jack Oelfke, DOI BAER Team Environmental Specialist

Regional Archaeologist Concurrence with item 7:

Concur: _____
Superintendent, Southern California Agency

Date:

Concur: _____ Date: _____
Natural Resources Officer, Southern California Agency

CONCLUSION

I have reviewed the proposals in the 2007 SoCal Fires Burned Area Emergency Response Plan in accordance with the criteria above and have determined that the proposed actions would not involve any significant environmental effect. Therefore it is categorically excluded from further environmental (NEPA) review and documentation or tiered from existing and valid environmental documents. Burned area emergency response team technical specialists have completed necessary coordination and consultation to insure compliance with the National Historic Preservation Act, Endangered Species Act, Clean Water Act and other Federal, State and local environment review requirements.

Recommended:

/s/ Jack Oelfke

11/16/07

Jack Oelfke, BAER Team Environmental Specialist

Date

Approved:

James Fletcher, Superintendent, Southern California Agency, BIA

Date

John Kalish, Field Manager, Palm Springs-South Coast Field Office, BLM

Date

Andy Yuen, Project Leader, San Diego National Wildlife Refuge Complex, USFWS

Date

REFERENCES

- FIREWISE 2000. Southern California Agency Fire Management Plan, Volume 1. October 30, 2000. Bureau of Indian Affairs, Sacramento, CA.
- National Interagency Fire Center (NIFC). 2001. Review and Update of the 1995 Federal Wildland Fire Management Policy, Interagency Federal Wildland Fire Management Policy Review Working Group, National Interagency Fire Center, Boise, ID.
- U.S. Fish and Wildlife Service (USFWS). 2004. Wildland Fire Management Plan, San Diego National Wildlife Refuge Complex, U.S. Fish and Wildlife Service, Region 1, Sacramento, CA.